



Let us hope

BRAITHWAITE'S RETROSPECT.

VOL. LXII, JULY—DECEMBER, 1870.

THE
RETROSPECT OF MEDICINE:

BEING

A HALF-YEARLY JOURNAL,

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND
PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY

W. BRAITHWAITE, M.D.,

LATE LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN
AT THE LEEDS SCHOOL OF MEDICINE, ETC.

AND

JAMES BRAITHWAITE, M.D., LOND.

VOL. LXII. JULY—DECEMBER.

1870.

LONDON:

SIMPKIN, MARSHALL, AND CO.

EDINBURGH: OLIVER AND BOYD. DUBLIN: HODGES AND SMITH.

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Parcels of Books, &c., to

Messrs. SIMPKIN, MARSHALL, & Co., London.



PRINTED FOR D. I. ROEBUCK,
AT THE OFFICE OF THE YORKSHIRE POST, ALBION STREET, LEEDS.

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SYNOPSIS,

(ARRANGED ALPHABETICALLY), CONTAINING

A SHORT ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THIS VOLUME, SHOWING
AT A GLANCE, THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED
BY DIFFERENT WRITERS WITHIN THE HALF-YEAR.

AFFECTIONS OF THE SYSTEM GENERALLY.

ACUTE RHEUMATISM AND GOUT.—In cases of acute rheumatism and gout it is of the greatest importance to keep the inflamed joints at absolute rest, to shield them from external pressure, and to give them ease. In rheumatism no other treatment is necessary; but in gout, the combination of iodide of potassium with iron to eliminate the poison, and at the same time to supply what is necessary for the growth of the red corpuscles of the blood, is advisable. It is well ascertained that acute gout causes a deficiency of the red corpuscles of the blood. The tartrate of iron is the best salt for combination with the iodide. (Dr. F. Sibson, *Lancet*, Aug. 13, p. 219.)

AGUE.—*Bromide of Potassium.*—Bromide of potassium, which was first introduced into practice as a remedy for enlarged spleen, has a great power over ague. In one case, illustrative of its action, the patient had had tertian ague for two months before admission to the hospital, and had taken quinine without benefit; after admission he took 84 grains more without benefit. Twenty-grain doses of bromide, three times a day, were then given, and he was discharged cured in ten days. It is found always to check the ague, and often to cure it permanently, not always, but that is the case with any remedy. (Dr. Moxon, p. 25.)

Substitute for Quinine in Ague.—The leaves and roots of boxwood contain an alkaloid called by M. Pavia, who has isolated it, bussine. It is found to be a good substitute for quinine in the treatment of ague. (M. Pavia, p. 394.)

CONTAGIOUS DISEASES.—*Propagation by Milk.*—Milk has a peculiar power of absorbing smells. If a bowl of milk is placed near recent asphalting, it will be found to taste and

smell of the asphalte. It is found that milk will absorb a variety of offensive odours, such as those from assafoetida, fæces, and urine. This power of absorption resides principally in the cream. It has not been positively proved, but it seems not unlikely, that it may in like manner absorb contagious matters, and so be a means of propagating such diseases as typhoid and scarlet fevers. (Mr. L. Tait, p. 27.)

CONTINUED FEVER. — *Bromide of Ammonium*. — Bromide of ammonium and potassium are of great use in cases of continued fever complicated with sleeplessness, convulsions, and other cerebro-spinal symptoms. The dose given is fifteen or twenty grains at bedtime, or oftener if necessary. (Dr. W. Moore, p. 22.)

FEVER. — *Origin and Mode of Propagation*. — A medical practitioner, at Eichstadt, in Germany, has published an account of the sanitary condition of that district, which seems to prove that impure drinking water is never the cause of enteric fever. There are no streams, and only a few wells, and these in private possession. The wells only contain a few feet of water from surface drainage. Water is only obtainable by collecting the rain-water in cisterns by means of gutters. In these cisterns it becomes quite alive with organic matter. The living matters are quite visible to the naked eye. The cattle drink water almost black from admixture with drainage from manure heaps; and yet there has not been a case of fever in this district within the memory of the writer, nor have the cattle died from any epidemic disorder. The land lies very high, and geologically consists of porous limestone. (Dr. Buxbaum, Prof. Pettenkofer, p. 13.)

SCARLATINA. — The great use of ammonia in the treatment of scarlatina is acknowledged. This success does not arise from any fluidifying action of the ammonia upon the blood, but simply from its stimulating properties. A far better stimulant than ammonia is champagne. Professor Williamson, of Owen's College, Manchester, acting upon this idea, has for some years treated all his cases of scarlatina with champagne, and that from the very commencement of the disease. The moment he has been certain that the case was one of scarlatina, he has given the champagne regularly and freely. The more severe the febrile symptoms, being convinced that they arose from an atonic rather than an opposite state, the more bold has been his administration of the stimulant. He states that the success of this treatment has been almost uniform, the rash having always well come out, and not one single

example of malignant sore throat having occurred in his practice. In a case which threatened to be bad and typhoid in character, as much as one full-sized bottle of champagne was given every twenty-four hours, for the first four days. The result was that the sordes disappeared, and the malignant character of the throat affection passed off completely. No signs of intoxication or excitement appeared. (Prof. W. C. Williamson, p. 18.)

The following plan of treatment has been pursued with much success. On first seeing the patient, a powder, with five grains of calomel, and ten of mercury and chalk is given, and a tablespoonful of castor oil on the following morning, so as to thoroughly unload the bowels. A dose of castor oil every other night should be given for the same purpose, and it will bring away putrescent and offensive evacuations. Strong doses of the aromatic spirit of ammonia, varying according to the age of the patient, should be given every hour. No other food than undiluted sweetened milk should be given from the commencement of the disease, and it will be found that the patients do well upon this unstimulating diet, and that the little ones take it readily. If the cervical glands suppurate they should not be lanced, for if so, the discharge continues for a long time, exhausting the patient. (Dr. R. Sweeting, p. 20.)

SUNSTROKE.—There is one thing common to all cases of sunstroke, namely, a cessation of the perspiration of the skin for some days previously, and amongst all the diversity of symptoms during the attack there is one symptom common to all, extremely high temperature, higher indeed than is found in any other disease. The rise of temperature is probably the effect of the arrest of perspiration. The treatment must in the first place be directed to reduce the excessive temperature, for which purpose the cold douche is the most effectual means. The patient may be stripped, and cold water poured from a height of three or four feet. Ice to the head is a valuable remedy. As, however, depression of the vital powers forms a serious element in the disease, care must be exercised that the cold applications are only carried to the extent indicated by the condition of the patient. If he is in a state of collapse when first seen, they would be obviously improper, and the use of diffusible stimuli should be preferred. Venesection is always found to hasten a fatal termination. The order of treatment generally required is, cold douche first and stimulants afterwards, followed by a purgative enema and sinapisms to the extremities. (Dr. Van de Warker, p. 30.)

AFFECTIONS OF THE NERVOUS SYSTEM.

CHOREA.—A great deal of the influence set down to electricity, ice-bags, iron, arsenic, quinine, and other medicines, has been imaginary. The really curative agents, in most of the cases published as illustrative of these plans of treatment, have been change from a crowded dwelling-house to a well-ventilated hospital ward, to good food, and quiet. (Dr. J. R. Reynolds, p. 61.)

Chloral.—Chloral, judging from a case related, is not of much use in chorea when given in one large dose a-day. In this case it was found that by giving eight grains every four hours throughout the day and night, the symptoms rapidly abated, and in nine days all choreal movements had entirely ceased. (Dr. W. Strange, p. 121.)

DELIRIUM TREMENS.—*Chloral.*—Thirty grains of chloral were given to a patient suffering from delirium tremens. He went to sleep immediately after and slept for three hours, and after being awake for an hour the dose was repeated, with the result of sending him to sleep immediately. Next morning the patient was perfectly rational. (Dr. J. R. Reynolds, p. 101.)

Tincture of Digitalis (half-ounce doses).—Five cases of delirium tremens treated by half-ounce doses of tincture of digitalis are reported, and we must confess that the results of the treatment surprise us. In the first, case, after opiates had completely failed, and a fatal termination appeared imminent, the administration of the digitalis was followed by sleep in twenty minutes. The sleep lasted several hours, and on her awaking two drachms more of the tincture were given. After this no further treatment was required. In the second case, sleep came on in ten minutes after the exhibition of the remedy; in the third in less than twenty minutes; in the fourth in a quarter of an hour; and in the fifth within twenty minutes. In all, the first effect of the remedy was reduction in the frequency of the pulse, with an increase in its volume. In all, opium had been previously tried without any benefit. All the patients were comparatively young. (Dr. A. Wiltshire, p. 104.)

ELECTRICITY.—*Effect of Electricity on Muscles.*—Electricity may be made to do either of two things, namely, reduce the contractile power of an over-acting muscle, or increase the contractile power of a feebly-acting or paralysed one. To do the former, pass a continuous galvanic current through the muscle, downwards along the course of the limb. This current must not be sufficiently strong to cause pain. The same thing may be accomplished by weak faradisation rapidly

interrupted—more rapidly than in most electro-magnetic machines. To do the latter, it is only necessary to use the interrupted current. Supposing the case is one of wry-neck, it may be treated by applying the galvanic current to the contracted muscle to reduce its contractility, or the interrupted current to the opposite muscle to increase its contractility, so as to overcome the contraction on the other side of the neck. (Dr. J. R. Reynolds, p. 52.)

Anæsthesia of a limb.—The cases of anæsthesia of a limb, in which *par excellence* electricity is of service, are not those occasionally met with accompanying some acute cerebral disease, but those which are more or less “hysterical” in their origin. There is generally marked anæsthesia of a limb, associated with a certain amount of awkwardness of movement, sometimes with definite loss of power. Cases of this kind, which have lasted for months or years, will be not unfrequently cured by electricity, after two or three applications. (Dr. J. R. Reynolds, p. 61.)

EPILEPSY.—It is essential to remember this clearly established fact—that during an attack of epilepsy there is anæmia of the brain, owing to contraction of the cerebral capillaries and small arterial vessels. This takes its origin in anæmia or exhaustion, and any cause whatever which tends to produce an anæmic condition of brain, whether sudden or gradual, is sufficient to produce convulsions. Extensive disease may occur in the centre of the brain; but, unless the surface be involved, the central pathology will not be associated with epilepsy as a concomitant. (Dr. J. T. Dickson, p. 108.)

INSANITY.—*Chloral.*—Chloral is invaluable in cases of insanity, procuring sleep when given in large doses, and calming excitability when given in smaller doses during the day. One patient required 45 grains to cause sleep when in the sick ward, but placed in a dark cabin by night, 20 grains answered the purpose. (Dr. W. Macleod, p. 123.)

NEURALGIA.—*Electricity.*—In painful affections, such as the neuralgiæ, migraine, sciatica, tic douloureux, and also in some conditions of modified sensibility, such as the spontaneous feeling of heat or cold, the sense of numbness, tingling, “pins and needles,” or such like discomforts, electricity is often of considerable service. The continuous galvanic current should be used, and it should be only of such strength as to be just perceptible by the patient. It should be applied by well-wetted sponges. (Dr. J. R. Reynolds, p. 71.)

Supra-Orbital Neuralgia.—*Removal of a portion of Nerve.*—Supposing, owing to the severity of the patient’s sufferings, a

portion of the supra-orbital nerve is removed, the patient usually remains free from pain for three or four months, after which time it gradually returns, and the operation has again to be performed, with a like result. (Dr. J. Bell, p. 78.)

SCIATICA.—In a small porcelain vessel mix one grain of morphine and three grains of extract of belladonna with six drops of creosote. Whilst the patient is standing, make small incisions through the skin and subcutaneous cellular tissues alternately on either side of the nerve. Having wiped off the effused blood, rub in the composition. The morphine and belladonna allay the pain, and the creosote sets up, if properly applied, a certain amount of local irritation, which is very desirable. To every patient suffering from sciatica iodide of ammonium should be given. Its therapeutic power is superior to that of the iodide of potassium. (Dr. J. Waring-Curran, p. 84.)

TETANUS.—*Calabar Bean.*—Calabar bean alone possesses the power of paralysing the motor tract of the spinal cord, without depressing the action of the heart to any great degree. This power at once marks it out as a suitable remedy in tetanus. An interesting case is related illustrative of this plan of treatment. During the attack no less than 40 grains were given by the skin and 49 by the mouth. (Mr. A. Boufflower, p. 91.)

Chloral.—Chloral is reported well of in tetanus by those who have tried it. We give one case which was so treated in Guy's Hospital. We must say, however, after the perusal of several such cases, that the results are not by any means very striking, and that the remedy seems far better adapted for employment in many other diseases than in tetanus. (Mr. J. Birkett, p. 93.)

A case of acute traumatic tetanus is related in which three drachms and a half of hydrate of chloral were given in twenty-four hours. The first dose was one drachm, and the rest was given in doses of half-a-drachm at a time. The patient was asleep within five minutes of the first dose. Eight hours afterwards the temperature had fallen from 103° to 99·5°, and there was marked improvement in all the symptoms. During the remainder of the case the chloral was given on an average at the rate of two to two and a half drachms per diem—in all, six ounces and a quarter of chloral during the three weeks' treatment. It was found that, if at any time the chloral was not given for a period of more than six hours, the symptoms invariably became more intense, and a larger dose was required afterwards. (Dr. A. Ballantyne, p. 96.)

Nitrite of Amyl.—The physiological action of nitrite of amyl is directly exerted on the ganglionic nervous tract; it paralyzes so that the nervous supply over the extreme vascular system is impaired; and the muscular system generally, if the effect be sustained, is thrown into relaxation. Hence its value in cases of excessive spasmodic action. Lately, Mr. Foster, of Huntingdon, has administered the nitrite with complete success in a case of traumatic tetanus, holding the convulsions in check for the long period of nine days. Five minims should be administered by inhalation whenever an attack is threatened. It has also been used with success in angina, asthma, and colic. (Dr. B. W. Richardson, p. 376.)

AFFECTIONS OF THE CIRCULATORY SYSTEM.

ANGINA PECTORIS.—Angina pectoris is nothing more or less than a spasmodic contraction of the muscular structure of the heart and aorta. It arises from morbid innervation of the heart by means of the abundant supply from the sympathetic and its ganglia. In many cases it is reflex in its character, the exciting cause being some such affection as ossification of the coronary arteries, or disease of the aorta. Moreover, just as there are cases of epilepsy which are idiopathic, so there are probably many cases of angina pectoris the essential nature of which consists in an inherent constitutional predisposition to the malady, expressing itself whenever the nervous system is especially irritated or excited by causes of any kind operative primarily in any part of the body. (Dr. J. Chapman, p. 141.)

HEMORRHAGE.—*Arrest of, by Over-flexion of a Limb.*—We possess in over-flexion of a limb a blood-controlling agent of considerable power which can be applied on the shortest notice, and which requires neither instruments nor apparatus other than can be obtained in the poorest cottage. In the upper extremity, if the forearm is bent on the arm with a roll of lint or linen on the bend of the elbow, the pulse is always entirely stopped; and in the lower extremity, if the leg is flexed on the thigh and the thigh on the abdomen the pulse in the anterior tibial is almost invariably stopped. When we remember the difficulty of arresting hemorrhage from a wound of the palmar arch, and read in surgical works that secondary hemorrhage from the deep arteries of the leg is a sufficient reason for amputation, we see the importance of these observations. This is further enhanced by remembering how we may be called upon to treat hemorrhage from wounded arteries of a limb, when perhaps far from home,

and in small dark rooms with insufficient light. (Dr. G. Y. Heath, p. 218.)

PALPITATION.—*Diagnostic Value of.*—Palpitation is solely diagnostic of a disturbance of the balance which exists between the blood to be driven by the heart and the power to drive it; and that too in the direction of cardiac inability. This idea is founded not only on its existing causes, but also on the known action of the remedies which enjoy the greatest reputation for efficacy in allaying it. (Dr. J. M. Fothergill, p. 133.)

AFFECTIONS OF THE RESPIRATORY SYSTEM.

ASTHMA.—In severe paroxysms of asthma chloral is worth a trial. In congestive bronchitis it has proved equally beneficial. It should be given in doses of from twenty to thirty grains. (Mr. A. M. Adams, p. 372.)

PNEUMONIA.—It is well to bear in mind that the actual occurrence of pneumonia is preceded by blood-poisoning. The exudation into the lung is the direct result of the state of the blood, and when it occurs there is a fall of temperature, it in fact may be looked upon as analogous to the eruption in small-pox. If we can catch the disease in the stage of the initiatory fever, it is in many cases possible to prevent the pulmonary mischief by favouring exudation through other channels. As a check to the action of the skin is the exciting cause of the disease, in a large proportion of cases the restoration of a free action of the skin is the main object of treatment. An emetic, or a purgative dose of calomel or colocynth are frequently of great service with the same object. This is acting upon the hint conveyed by the fact that vomiting and diarrhoea not unfrequently occur spontaneously at the commencement of a pneumonic attack. (Dr. G. Johnson, p. 149.)

TUBERCULAR MENINGITIS WITH CONVULSIONS.—In cases of tubercular meningitis with convulsions in children, relief may be obtained by giving chloral in five-grain doses every three hours until a sedative effect is produced. (Mr. A. M. Adams, p. 372.)

AFFECTIONS OF THE DIGESTIVE SYSTEM.

CHOLERA COLLAPSE.—After death from cholera collapse the pulmonary vessels and right side of the heart are found full of blood, whilst the arteries and left side of the heart are

empty. This is owing to spasm of the arterial vessels, and this spasm is the one constant symptom present in the disease. It is this which we must endeavour to combat if we would treat the disease successfully. No doubt if we could neutralise the poison it would be better, but we cannot, and probably never shall. If the spasm could be relieved, warmth of surface and restoration of the circulation would at once ensue. All experience in India proves that the use of opium and of large doses of stimulants is actually injurious. (Dr. T. Farquhar, p. 39.)

DIARRHŒA AND DYSPEPSIA.—*Raw Meat*.—Raw meat is a remedy, or rather aliment, of great value in cases of dyspepsia, in which undigested food causes irritation of the bowels and attacks of diarrhœa. It seems to furnish the most efficient kind of nutriment with least inconvenience from bulk or other quality, and is digested and absorbed with as little fœcal residuum as possible. In cases of acute summer diarrhœa in children, raw meat is in itself both a remedy for the diarrhœa and a nutriment for the child; also in the chronic diarrhœa of children, in the habitual diarrhœa associated with “marasmus,” and, lastly, in the cases of obstinate vomiting of pregnancy, whether associated with diarrhœa or not, it is frequently of the greatest service. It must be prepared by pounding or scraping raw beef or mutton, so as to get out the red soft muscular substance as free as possible from all fibre and fat. It must be a soft pulp, giving no feeling of resistance when squeezed between the fingers. (Dr. R. Druitt, p. 158.)

FISTULA-IN-ANO.—*New Instrument for the Operation*.—Mr. Weeden Cooke uses a scissors constructed for him by Messrs. Weiss. The finger having been passed into rectum as a guide, one blade of the scissors is introduced into the fistula up to its extreme point, and then the other blade into the rectum. The two blades are then connected by a small screw, and by one rapid scissors-action the sphincter is divided. (p. 228.)

GASTRODYNIA.—*Arsenic*.—When the pain seizes the patient independently of digestion, and is not preceded or followed by any dyspeptic symptoms, the judicious use of arsenic is the best treatment. The bowels are subject to the same kind of pain, but whether it occurs in the stomach or the bowels it is essentially neuralgic in its character. It is often associated with mental depression. The curative effects of the arsenic are most striking in severe cases of paroxysmal pain, but many cases yield to it which closely resemble dyspepsia in the character of the pain. In most cases the liquor arsenicalis answers every purpose, but when the system is more

than usually susceptible of the action of the mineral the liquor sodæ arsenitis seems to irritate less. (Dr. A. Leared, p. 155.)

TONSIL GUILLotine.—There is great difficulty in removing the tonsils of children owing to the tendency to shut the mouth when the tonsils are pressed upon. To obviate this, Mr. Ewens, of Cerne Abbas, has had a gag adjusted to the guillotine of Mathieu, which at the same time acts as a tongue depressor. After being adjusted over the tonsil, by a single continuous movement of the thumb transfixion and amputation are instantaneously accomplished, without a chance of failure, and with the utmost facility, the mouth being kept wide open by the gag for the adjustment of the instrument over the tonsil and during its removal. (Dr. J. Ewens, p. 227.)

AFFECTIONS OF THE URINARY ORGANS.

ACUTE BRIGHT'S DISEASE.—Rest in bed with a scanty diet will suffice for the cure of many cases of acute Bright's disease, without any other treatment whatever. The diet may consist of milk alone, or milk with an egg or two in the course of the day, or with the addition of beef-tea or animal broth. Under this regimen the congestion of the kidney soon ceases, and the urine again becomes copious and free from albumen. When the congestion is extreme, local bleeding by leeches or cupping on the loins is useful. Alcohol in any form is as a rule injurious, as it imposes extra work on the kidneys. In all cases of recovery from long-continued albuminuria iron in one form or another is called for, and the tincture of the perchloride and the syrup of the phosphate are the most suitable preparations. (Dr. G. Johnson, p. 161.)

ALBUMEN IN THE URINE.—*New Test for.*—Add to the liquid to be examined, in a test tube, ten minims of alcohol of specific gravity 0.805, shake thoroughly, but gently, so as to avoid the production of froth. Then drop in the same quantity of carbolic acid and shake very thoroughly. Allow it to stand for a minute; and if the merest trace of albumen is present, distinct flocculi will be seen floating in the liquid. This is much more delicate than the heat and nitric acid test. (Dr. C. M. Tidy, p. 168.)

LITHOTRITY.—From 184 cases of lithotritry in the adult, Sir Henry Thompson deduced the following rule: that lithotritry should be applied to all calculi obviously less than a quarter of an ounce in weight, easily discovered by sounding, and that all larger ones should be operated upon by lithotomy. The rate of mortality will correspond with augmentation in

the size of the stone, and with the amount of existing disease and age on the part of the patient. Given a small stone in a fairly healthy person, and success is certain. (Sir H. Thompson, p. 228.)

STRICTURE OF THE URETHRA.—*New form of Bougie.*—Mr. Jackson, of Wolverhampton, describes a form of bougie, or “catheter conical sound,” which he devised some years ago, and had a set of them made for the treatment of stricture by simple dilatation. The form of the instrument, instead of resembling simply an elongated cone, is made so as to consist of two cones, their bases being conjoined. The first cone commences at the extreme point of the instrument, and extends for a distance of three inches, its base here meeting with the base of the second cone, and this latter, gradually and almost imperceptibly diminishing in size, reaches the handle, a distance of six inches. It is evident that a maximum cylindrical thickness is obtained at a certain known distance from the point. The instrument is channelled from a short distance below the point, so as to combine the advantages of both catheter and bougie, without the disadvantage of grazing the stricture in passing, as is done by the eyelets of a catheter. (Mr. T. V. Jackson, p. 230.)

URINARY CALCULUS.—*Examination of.*—1. Heat a portion of the powdered Calculus upon platinum foil.

Destroyed. (a) *Uric acid : Ammonic urate : Cystine : Cholesterolin : Bile-pigment.*

(b) *Uric acid from Calcic and Sodid urates. Ammonia from Triple Phosphate. Oxalic acid from Calcic oxalate.*

Not Destroyed. (c) *Calcic Phosphate : Calcic Carbonate.*

(d) *Calcic Carbonate from Calcic Oxalate and Urate. Sodid Carbonate from Sodid Urate. Magnesic Phosphate from Triple Phosphate.*

If it chars and gives odour of burnt feathers, add to another portion a drop of concentrated nitric acid and evaporate to dryness: pink colour; cool, and add ammonia: purple colour; *Uric acid* or *Urates*. If the odour is peculiarly disagreeable, resembling carbonic bisulphide, dissolve in ammonia, and allow the solution to evaporate spontaneously; microscopic six-sided plates indicate *Cystine*. Mix another portion with Lime, Ammonia may be evolved from the *Urate* or *Triple Phosphate*.

2. Ignite another portion in the blowpipe flame until it burns entirely away (Class (a), see above), or leaves a white

residue. If it fuses, it consists of the mixed *Phosphates of Calcium, Magnesium and Ammonium*. Place a portion of the residue on red litmus paper and moisten with a drop of water; alkaline reaction indicates *Soda* or *Lime* from Class (d) or from *Calcic Carbonate*. Dissolve the rest of the residue in water and filter. If the filtrate is alkaline, add a drop of hydrochloric acid and evaporate cautiously to dryness; microscopic cubical crystals prove the presence of *Sodium*. Dissolve the residue, insoluble in water, with hydrochloric acid, observing whether or not any effervescence due to carbonic acid takes place; add a comparatively large quantity of ammonic nitromolybdate, and heat; a yellow precipitate indicates *Phosphoric Acid*.

3. Boil a portion of the powdered calculus in dilute hydrochloric acid; effervescence indicates calcic carbonate; filter; neutralise the solution by ammonia, and add acetic acid in excess; a turbidity indicates *Calcic Oxalate*. To the clear solution (or the filtrate if calcic oxalate is present) add ammonic oxalate; a precipitate indicates *Calcium, which was not previously in the state of oxalate*; filter, if necessary; add ammonia, and stir; a white crystalline precipitate indicates *Magnesian Phosphate*.

4. Biliary Calculi. *Cholesterin* is soluble in boiling alcohol, in ether, or in benzole; and, upon spontaneous evaporation of the solution, is deposited in rhombic nacreous laminæ, which polarize light.

Bile-pigment is insoluble in ether; soluble in potassic hydrate, and, when treated with nitric acid, becomes first green, then blue, passing into violet, red, and yellow. (Dr. Campbell Brown, *Liverpool Medical and Surgical Reports*, p. 43.)

AMPUTATIONS, FRACTURES, AND DISEASES OF BONES AND JOINTS, ETC.

ANTISEPTIC TREATMENT SUITABLE FOR WAR.—Wash the wound thoroughly and also the surrounding skin with a saturated solution of carbolic acid in water, introducing the fluid by means of a syringe, and manipulating the parts freely so as to ensure its penetration to all parts of the wound. Any vessels should be tied with properly carbolised catgut ligature, both ends of which should be cut off close to the knot. If none of this ligature is at hand, torsion should be employed; but if it is absolutely necessary to use a ligature, it should be carbolised. Then, after removal of any foreign substance, carefully cover the wound with two or three layers of oiled silk smeared on both sides with a

solution of carbolic acid in five parts of any of the fixed oils. Next, apply a thick layer of linen, lint, or charpie, soaked in the oily solution of carbolic acid, and sufficiently large to cover the edges of the oiled silk at least three inches all round. Lastly, cover the oiled cloth or lint with a piece of thin gutta percha sufficiently large to cover everything by an inch or more, and retain it securely in position by a roller steeped in antiseptic oil. Round this again wrap a still larger piece of folded cloth, say a folded towel, also steeped in the oily solution of carbolic acid, and cover it with a piece of oiled silk or gutta percha. (Prof. Lister, p. 184.)

AMPUTATION AT THE KNEE-JOINT.—There is this great advantage in amputation at the knee-joint, that it is not attended with the shock to the system which occurs when the femur or the tibia high up is divided. It is not necessary to remove the condyles of the femur, but the anterior flap must be long and broad, so that they may be well covered. As there is always a possibility of a little sloughing of the anterior flap, it is well to preserve a short posterior flap also. The actual line of the bases of the flaps should be a finger's breadth below the level of the articulation. (Mr. C. F. Maunder, p. 171.)

AMPUTATION BY A CURTAIN FLAP OF INTEGUMENT.—It is a mistake to include a quantity of muscle with vessels, nerves, and fascia, in the flap of a stump intended to bear weight. The skin only should compose the anterior flap. In amputation of the thigh the posterior flap should hardly exist at all—the incision should here be made slightly curved forwards, whilst all the muscles should be cut transversely, and in a line with the bone section. The anterior flap should be sufficiently long to cover the whole surface of the wound. The line of suture will be at the posterior and inferior margin of the stump. One great advantage of this plan is that the flap by its own weight falls over the face of the stump, requiring little or no pressure to keep it in position. There is no danger of conical stump, and but little of pyæmia, phlebitis, and deep-seated suppuration. (Mr. J. D. Hill, p. 174.)

CARIOUS AND DISEASED BONE.—*Local Application of Sulphuric Acid.*—If sulphuric acid will dissolve and soften bone out of the body, why should it not do so when applied to dead bone, contained in the living body? Acting upon this idea Mr. Pollock, of St. George's Hospital, has based a most successful plan of treatment in cases of carious and necrosed bone. Supposing the case to be one of necrosis of the bones of the skull, he touches the dead bone daily with a lotion of

equal parts of strong sulphuric acid and water. It is found that the necrosed bone crumbles away from day to day, and rapidly disappears. As this takes place healthy granulations spring up from below, and fill up the space formerly occupied by the bone. The action of the acid is limited to the diseased bone; it does not act upon the healthy bone. It is perfectly safe and unirritating, even should it touch the dura mater. The antiseptic qualities of the acid are also no small recommendation. It may be used upon lint, or by means of a syringe, or simply brushed over the part if sufficiently exposed for that purpose. (Mr. G. Pollock, p. 195.)

Inflammation of the Interior Structure of Bone. — Inflammation of the interior structure of bone is, as a rule, allowed to go on for months or years, until softening of its structure, abscess, and other well-known disastrous effects are produced. Why should this inflammation be treated differently in bone, to what it is in other parts, in which case the surgeon does not hesitate to cut down upon the part and give relief? Take a knife and cut down upon the inflamed bone, using first the knife, and then applying a point of potassa cum calce, and so on alternately until the bone is reached; then by means of a gimlet or drill perforate the hard tissue into the centre of the inflamed bone. The caustic must then be applied into the bottom of the hole made. Prompt relief follows, and a thin reddish serum continues to flow from the opening until a healthy suppuration takes place. In this manner the trochanter has been perforated in thirteen cases of morbus coxæ. The use of the caustic in cutting down on the bone renders the operation bloodless. Chloroform should of course be given. (Mr. F. Kirkpatrick, p. 202.)

DISLOCATION OF THE SHOULDER.—*New Plan for Reducing.*—Seat the patient on the floor with his back resting against the side of a bed. Stand upon the bed and gradually raise the dislocated arm from the body, at the same time placing your foot, without a boot, upon the top of the shoulder to steady it. Extension upwards must be gradually increased until the bone slips into its place, which it will usually do with the greatest ease. (Mr. George Lowe, St. Bartholomew's Hospital Reports, vol. vi. p. 4.)

DISTENSION OF THE FRONTAL SINUS.—Great deformity arises in cases of distension of the frontal sinus from pent-up secretion or pus, owing to the displacement of the eye which occurs. The only successful plan of treatment is to re-establish an opening into the nasal cavity. The surface of the tumour must first be exposed by a longitudinal incision; then the tumour itself is to be laid open to the same extent as the

incision. It must then be ascertained at what point the tip of a finger in the sinus most nearly approaches the tip of a finger of the other hand passed up the nostril. After a little search it will be found that at one part the fingers will almost meet, there being only a thin plate of bone between them. The finger in the nostril being retained as a guide, a passage must now be forced into the nose, and an india-rubber tube, with small drainage holes cut at short distances, introduced, one extremity of which is to be fastened to the forehead, whilst the other protrudes from the nose. A free discharge will probably drain through the tube, which should be shifted twice a day, and previous to each shifting the cavity of the cyst should be thoroughly cleansed with a weak solution of carbolic acid squirted in through the drainage tube. (Mr. G. Lawson, p. 215.)

NEW BULLET EXTRACTOR.—Surgeon Tuson, of the Bengal Medical Staff, describes a new bullet extractor, the construction of which will be understood at once by referring to the wood-cut at p. 214. It contains a central screw, which can be made to penetrate the bullet when seized by the three grasping points. It appears to be an improvement upon the ordinary bullet forceps. (p. 213.)

REFRACTURE OF BONES.—Although at the end of two months a femur which has been broken will bear the weight of the body, because the weight is vertical, yet it will yield to force laterally applied even at the end of a longer period than this. The femur has been refractured at the end of eleven weeks, and the bones of the forearm at the end of seventeen weeks. Chloroform having been administered, bring the limb to the edge of a table, which is covered with half-a-dozen folds of blanket. The weight of the body of the operator must then be brought slowly and gradually to bear upon the point of fracture; and any additional force in moderation may be resorted to. There need be no fear of breaking the bone in any other place than at the old place of fracture, for it is almost impossible for a man of good muscular power to break even a radius in the dried state, much more a femur. (Mr. F. C. Skey, p. 176.)

SPLINTS.—*New Material for Splints.*—Hatters' felt, cut to the required shape, softened in hot water, and moulded to the limb, forms an excellent splint for fractures in children. It stiffens as it dries. (Mr. Hutchinson, p. 180.)

Flannel and Plaster of Paris Splint for Leg.—Lay a double layer of flannel underneath the leg, and, bringing the edges forwards over the crest of the tibia and the dorsum of the foot, cut off

all the material over and above what is required to neatly and entirely cover the limb, including the fold at each side of the ankle. Now make a double row of stitches about half an inch apart along the whole length of the posterior part of the flannel splint, keeping accurately to the middle line. Next replace the flannel on the limb, pinning up the layer next the skin, but allowing the outer layer to fall back on each side. The outer surface of the inner layer must then be spread with plaster of Paris to a depth of about two lines, the other layer is then brought up and accurately adjusted. The two layers of flannel, with the plaster of Paris between them, will soon form a hard firm splint accurately moulded to the limb. It can be retained in position by bandages. The part between the two rows of stitches behind being free from plaster of Paris imparts a certain amount of elasticity to the splint, and forms a hinge, enabling its removal or temporary bending back for inspection. (Mr. C. Heath, p. 179.)

SUPPURATIVE SYNOVITIS OF THE KNEE-JOINT.—In cases of suppurative synovitis of the knee, if the patient is old or enfeebled in constitution, the prospect of affording relief by laying open the joint is by no means good. A case of this kind, in which the patient was exhausted by long confinement and suffering is related by Mr. Bickersteth, of Liverpool. He opened the joint by an incision four inches in length on its outer side and pressed out a considerable quantity of matter, the entrance of air being prevented by keeping folds of lint soaked in carbolic oil over the incision. The interior of the joint was next washed out by throwing in upwards of a pint of the watery solution of carbolic acid (1 part in 40). This fluid was then well pressed out, and the wound dressed with carbolic oil on lint. The thigh was supported by a many-tailed bandage, so as to keep the walls of the abscess in contact. A great deal of care and skilful management was subsequently required, but the case did well, and is an excellent example of the value of the antiseptic treatment (Mr. E. R. Bickersteth, p. 187.)

TRANSVERSE FRACTURE OF THE PATELLA.—Mould a gutta-percha splint to the front of the limb and another to the back of it. Cut a hole in the anterior splint the size of the patella. Bandage the limb carefully over the splints, forcing the patella into the aperture in the anterior splint. (Mr. J. Woodman, p. 178.)

AFFECTIONS OF THE SKIN, ETC.

ABSCESSES.—In all abscesses give bark freely, and generally wine; and the larger the quantity of each borne the earlier will the abscess mature. (Mr. F. C. Skey, p. 205.)

New Instrument for the Evacuation of.—Dr. Dieulafoy, of Paris, has invented a syringe, somewhat like the subcutaneous injection syringes, for the evacuation of deep-seated abscesses. It is of glass, and contains about two ounces, and is fitted with two needles, one very long and slender the other shorter and wider. There is a lateral tube, closeable by a stop-cock, through which the syringe can be emptied without withdrawal from the wound. The inventor has operated upon the joints, the pleura, and even the head in cases of hydrocephalus, and in many cases with great advantage. (p. 154.)

BURNS.—*Local Stimuli.*—In all cases of burns or scalds resort at once to local stimulants. The soothing system of oil and cotton wool answers no purpose whatever beyond that of excluding air. Fifty years ago Dr. Kentish, of Bristol, first recommended this plan, the application recommended by him being spirits of turpentine. This caused considerable pain for two or three hours after its application, but after that there was complete freedom from it. Dr. Kentish's treatment was pursued in most of the large hospitals, with success, but it gradually went out of use, why it is difficult to say. The application of a strong solution of nitrate of silver affords, however, even more complete relief, than does the turpentine, and it has this advantage, that its strength can be modified to suit each particular case. The lotion used should be of the strength of five grains to the ounce in the case of a child, up to twelve grains to the ounce in that of an adult. After the free application of the nitrate, the parts should be wrapped up in cotton wool, and an opiate administered in brandy. (Mr. F. C. Skey, p. 258.)

CICATRICES FROM BURNS.—The evils attendant on large cicatrices from burns may be relieved by very simple means, viz., the relaxing the tension caused by these bridles by making a large number of small divisions of the cicatrix. The incisions may be close together, and eight or nine lines in length. These small wounds will heal from the edges, giving a greater length of cicatrix and more freedom to the joint, and the process may be repeated again and again if necessary. (Mr. F. C. Skey, p. 260.)

CORNS.—*Radical Cure of.*—Cover the surface with a vesicating plaster well charged with cantharides powder. In twenty-four hours the raised cuticle round the corn can be removed and a coating of tannin laid on the exposed and tender surface, then a tannin ointment laid over the part. The rationale of the process is in fact "tanning the corn." (M. de Pontevés, p. 265.)

GANGLIONS ON THE WRIST.—Bending the hand forwards in order to tighten the skin over the cyst, pass vertically into the tumour a broad-shouldered lancet. By a lateral movement of the instrument the orifice will be dilated, and the contents will freely escape. The sac must then be compressed and kneaded in every direction that every particle of its contents may be evacuated. Then apply a well made thick compress of lint, and strap it down tightly with plaster, and, lastly, apply a roller bandage. In forty-eight hours the wound has healed, and the ganglion is seen no more. (Mr. F. C. Skey, p. 203.)

GLANDULAR ENLARGEMENTS AND SCROFULOUS DISEASES.—*New Iodine Paint.*—The following is an excellent application in in cases of glandular enlargements and scrofulous diseases, wherein iodine is called into requisition. Rub down half an ounce of iodine and a like quantity of iodide of ammonium in a Wedgwood mortar, and gradually dissolve it in twenty ounces of rectified spirit; to this add four ounces of glycerine, shaking the solution well. Iodide of ammonium is a more powerful absorbent than iodide of potassium. (Dr. J. Waring-Curran, p. 387.)

HARE-LIP.—*New Operation for.*—Dr. W. Stokes, jun., of Dublin, describes an operation for hare-lip which appears to us well worth studying by operating surgeons. The especial design of it is to avoid not only the notch at the red edge of the lip, but also the vertical groove which in all cases hitherto operated upon exists to a greater or less degree, and which is produced by the contraction or falling in of the tissues at this situation. The details of the operation can only be understood by reference to the original article. (Dr. W. Stokes, jun., p. 253.)

HERPES CIRCINATUS.—This disease is generally rapidly curable by the application of local astringents, such as tincture of perchloride of iron, sulphate of copper, or tincture of iodine. No other treatment is necessary. (Mr. C. H. Robinson, p. 262)

HOUSEMAID'S KNEE.—This is not produced by direct pressure but by side to side movement, in fact, by friction. The contents may be liquid, or a thick fleshy mass of lymph. In the treatment iodine is worthless, blisters both worthless and painful, and excision dangerous. A stout thread of silk passed through the centre of the tumour will convert the whole mass into an abscess, and this end is generally attained within a week or ten days. When converted into an abscess it simply requires opening freely. (Mr. F. C. Skey, *Lancet*, July 30, 1870, p. 147.)

Most cases of housemaid's knee can be treated successfully by the application of the ammoniacum and mercury plaster, along with rest. If acute symptoms are present they should be subdued before the plaster treatment is commenced. (Mr. C. R. Thompson, p. 204.)

RANULA.—Pass a simple thread of silk or flax through the centre of the tumour by means of a curved needle. In five or six days the ranula will be found reduced to less than half its original size, leaving the thread at some distance from it, but still clinging to the mucous membrane. This first thread is then removed and a second thread applied through the centre of the residue of the tumour, which will finally disappear in from three to four days. (Mr. F. C. Skey, *Lancet*, July 30, 1870, p. 147.)

HEALING OF WOUNDS BY TRANSPLANTATION—If a minute portion of healthy skin, the size of a millet seed, be transplanted to the surface of a large granulating sore resulting from a burn, and covered with a small piece of plaster, it will become the centre of formation of fresh skin. A slight incision should be made in the granulations, and the bit of skin embedded in them. At the end of a week there will be nothing to see of the transplanted skin, but in another week there will be apparent a spot or island of skin, which will rapidly increase in size. This discovery opens quite a new plan of treatment, applicable to all cases where there is loss of cutaneous structure. The credit of the original idea is due to M. Reverdin, but its introduction into practice in England to Mr. Pollock, of St. George's Hospital. (M. Reverdin, Mr. G. Pollock, p. 211.)

A number of cases are related in which Mr. Mason, of the Westminster Hospital, performed the operation of skin grafting upon granulating surfaces. Some were very successful, one or two unsuccessful. Mr. Mason comes to the conclusion that its success depends upon the ulcer being in a healthy condition. For instance, four pieces of skin were grafted upon an unhealthy ulcer of the leg, and they all failed to grow. The pieces transplanted were rather larger than those transplanted by Mr. Pollock, and thus did not disappear for a time, as is the experience of the latter gentleman. The transplanted skin was covered by a strip of transparent plaster. (Mr. F. Mason, p. 263.)

SMALL-POX.—*To prevent pitting after.*—By means of a small camel's hair brush touch the apex of each pustule as soon as the eruption becomes manifest, with strong vesicating liquid. The face should then be varnished over with flexile collodion,

made by mixing equal parts of neatsfoot or lard-oil, and colloidion. This at once allays the pain of the blistering, and limits its effect to the apex of the pustule in extent. After twenty-four hours a lotion formed of starch and glycerine, may be applied two or three times a day by means of a flat camel's hair brush, so as thinly to cover the part and exclude the atmosphere. (Mr. J. Startin, p. 265.)

WOUNDS.—*Iodine as a topical application.*—Iodine has a destructive effect upon living germs, just like that of carbolic acid, and it is probably owing to this that it has the excellent effect as a local application to wounds which it is found to have. Applied as a lotion, containing two grains to the ounce of water, it checks all putrefactive action, and promotes rapid healing. It appears to have a wonderful power of separating dead or dying tissue from the living and active, hence it is very likely to prove serviceable in carbuncle. In a case of scrofulous abscess in the groin, a solution containing in addition a little iodide of potassium was injected twice a day for three days, when rapid contraction and healing ensued. (Dr. J. Stirton, p. 209.)

VENEREAL AFFECTIONS.

GONORRHOEA.—Commence with a mild aperient, and for the next week or ten days simply direct your patient to abstain from active exercise, and moderate the amount of daily consumption of wine or other alcoholic drinks if large, the diet otherwise remaining the same. As soon as the local pain and profuse discharge are somewhat reduced, resort to quinine, iron, or other tonics; ten or twelve grains of citrate of iron and quinine twice daily, will answer the purpose well. At the same time wine may be given on the same tonic principle. At the expiration of about a week from the commencement of the treatment by tonics, an injection of one grain of sulphate of zinc to the ounce of water, used night and morning, may be prescribed. The above tonic plan of treatment will often cure a case of primary gleet in four days. (Mr. F. C. Skey, p. 276.)

CONSTITUTIONAL SYPHILIS.—Very few cases refuse to yield to a combination of $\frac{1}{8}$ th of a grain of perchloride of mercury, five to fifteen grains of iodide of potassium, and a scruple of chlorate of potash, taken three times a day in some bitter infusion. The chlorate of potash increases the efficiency of the mercury, besides preventing salivation. (p. 399.)

SARSAPARILLA IN SYPHILIS.—*The mode of administering.*—Perhaps no remedy is so valuable in constitutional syphilis as

sarsaparilla. Nevertheless its use appears almost to have gone out of date, owing to its not having been given in sufficient doses to produce its full effect. It has been in use in the Leeds Infirmary for a long period, chiefly under the advocacy of the late Mr. Samuel Smith. It is given in doses of four to ten ounces of decoction three times a day. The decoction used differs only in unimportant details from the compound decoction of the Pharmacopœia. The cases in which the sarsaparilla is most useful are those in which the system is thoroughly infected with syphilis, during the tertiary and visceral modes of its appearances. (Dr. T. C. Allbutt, p. 267.)

SLOUGHING SYPHILITIC SORE THROAT.—Great benefit may be derived by painting the diseased surface over with Calvert's liquid carbolic acid, undiluted, by means of a camel's hair brush. The brush should be pushed well upwards and downwards so as to reach as much as possible of the diseased surface. After the first application a weak solution should be substituted, and applied frequently. At the same time as good support as possible should be given, and, medicinally, five minims of liquor cinchonæ, five minims of Battley's solution of opium, and ten grains of iodide of potassium, in an ounce of water, three times a day. (Dr. C. S. Smith, p. 273.)

SYPHILITIC CACHEXIA.—*Chlorate of Potash*.—Chlorate of potash is often a remedy of great value in cases of syphilitic cachexia, accompanied by some local ulceration. It should be given in doses of ten grains, twice daily. In a case related, in which there were seven or eight small ulcers on the leg, a solution of chlorate of potash in glycerine, of the strength of one drachm to the ounce, was applied locally. The patient stated that the action of this was remarkable, and was visible every time he used it. (Mr. E. Wilson, p. 395.)

SYPHILITIC SKIN AFFECTIONS.—*Mercury*.—Few men have had better opportunities of judging whether mercury is really beneficial in syphilitic affections of the skin, than Dr. McCall Anderson, and his opinion is that "it is invaluable in appropriate cases." He considers that we are justified in bringing the patient under its influence, 1, When we have to treat one of the earlier of the cutaneous manifestations of syphilis in a person of sound constitution. 2, When some delicate organ, such as the eye, is simultaneously affected. 3, When there is a circumscribed syphilitic eruption of old standing, which resists external applications, and iodide of potassium in full doses.—(Dr. McCall Anderson, p. 271.)

To inject Mercury Subcutaneously.—Instead of administering mercury by the mouth, the process of subcutaneous injection

may be tried. Dissolve four grains of perchloride of mercury in an ounce of distilled water, and of this from seven and a half minims at the least (*i. e.*, a sixteenth of a grain) to fifteen at the most (*i. e.*, an eighth of a grain) should be injected once daily. About three grains altogether is usually required to affect the system. It does not usually produce salivation, although stomatitis is a frequent result. The disadvantage is that much pain is experienced for several hours after each injection. (Dr. McAll Anderson, p. 272.)

AFFECTIONS OF THE EYE.

CATARACT.—*Operation for Extraction.*—The operation for cataract may be performed either too early or too late. If done before the whole of the lens has undergone the cataractous change, the unaltered portion will be liable to remain in the capsule, or in the chambers of the eye, producing irritation. If, on the other hand, it is delayed until calcareous deposits have taken place on the surface of the cataract, and on the inside of the capsule, the capsule will not retract as is desirable when scratched by the curette, and if the extraction is successfully performed the pupil is obscured. (Mr. H. Walton, p. 233.)

SOFT CATARACT.—No other operation than the very simple one of lacerating the capsule is required. The soft interior becomes rapidly absorbed. (Mr. H. Walton, p. 234.)

IRIDECTOMY.—*New Instrument for.*—It is very necessary to be able to vary the iridectomy at will, in order to render it as useful as possible in each individual case, for instance, if the effect desired is simply optical, a narrow artificial pupil is required; if remedial, as in glaucoma, the removal of a large portion of iris is necessary. With the ordinary iridectomy forceps this is a difficult matter to accomplish. M. Liebreich has invented a new instrument, whereby the shape of the artificial pupil may be made independent of the dimensions of the corneal incision. This instrument can be introduced through a narrow opening in the cornea, and will then expand widely in the anterior chamber. The limbs of these forceps do not open in the ordinary manner, but turn round a longitudinal axis in such a way that their rotation alone suffices to open and close their curved extremities. The movement of opening and shutting takes place without the part of the instrument which is engaged in the wound participating in the least degree. There is not the least difficulty in the use of these forceps. (Prof. Liebreich, p. 251.)

OPHTHALMOSCOPE.—*New form of demonstrating Ophthalmoscope.*

—Place two rectangular prisms together, so that they form an equilateral cube, and upon one of its sides place a plano-convex object glass, with its plain surface against the surface of the cube. The whole must be enclosed in a brass mounting, with handle attached. There must be an aperture in the mounting, on the side opposite the lens, for the eye of the observer, and another on one side for a second observer. The fundus of the eye can be seen plainly and clearly by the second person, without any exercise of skill on his part. It is the invention of Dr. Wecker, of Paris. (Mr. R. B. Carter, p. 252.)

POSTERIOR SYNECHIA.—*New Operation.*—Having fixed the eye with a pair of forceps held by an assistant, and inserted the speculum, pass a needle through the cornea, near its sclerotic margin, at a considerable distance on one side of the adhesion, and in such a direction that when pushed onwards it crosses at right angles that radius of the lens in which the adhesion is lying. The needle is pushed onwards into the anterior chamber, and so guided by the operator that its point becomes engaged in the pupillary margin of the iris at the root of the adhesion. The simple contact of the needle point with the iris is sufficient for this, and no attempt must be made to bury the needle in the tissue. By a gentle lever action of the needle point towards the periphery of the iris, the corneal wound being the fulcrum, the adhesion is broken down by being stretched and ruptured, and the needle being slowly withdrawn from the eye, the operation is completed. (Dr. A. Ogston, p. 248.)

MIDWIFERY, AND THE DISEASES OF WOMEN AND CHILDREN.

ANÆMIA, LEUCORRHOEA, &c.—*Lactate of Iron.*—Lactate of iron is a tonic and blood-restorer of great value, especially in those numerous female complaints associated with great debility such as anæmia, chloro-anæmia, leucorrhœa, and passive hemorrhages. In functional palpitation of the heart dependent upon debility, and in certain forms of dyspepsia, it may often be prescribed with advantage. (Mr. J. C. Dickinson, p. 396.)

BLEEDING CANCER.—*Chloride of Zinc Paste.*—In a case of ulcerating cancer of the breast, the tumour having progressed so far that it is impossible to remove it by the knife or by any other means, and being liable to hemorrhage from the surface, there is perhaps no better plan of treatment than the

application of chloride of zine paste. A case is related by Mr. C. F. Maunder illustrative of this. The paste was not only applied to the surface of the sore, but two or three "points" of the same material, hardened, were forcibly pushed into an indurated portion of the adjacent mammary gland. By pursuing this plan of treatment healthy granulations appeared in the sore, and all unhealthy discharge and hemorrhage ceased. The wound at the last report of the case was contracting rapidly. (Mr. C. F. Maunder, p. 29.)

CHLORAL IN LABOUR.—If chloral is given in doses of gr. xv. every quarter of an hour, and the further administration regulated according to the effect produced, it has been demonstrated that labour may be conducted from its commencement to its termination without any consciousness on the part of the patient. It not only does not suspend, but rather promotes uterine contraction. It is probable that labours under the use of chloral will be found to be of shorter duration than natural, for unconscious contractions appear to have more potent effects than those which are accompanied by sensations of pain. It seems, however, desirable to restrict the use of chloral to the earlier stages of labour, leaving chloroform in the position which it at present occupies in the later stages. (Mr. E. Lambert, p. 280.)

In cases of tedious labour, the patient worn out, yet the os only partially dilated, give half a drachm of hydrate of chloral, and judging from three cases related, after a refreshing sleep the labour will be concluded with great rapidity and ease. It appears as if the os goes on dilating during sleep from chloral more rapidly than it did previously. (Mr. J. G. Da Cunha, p. 288.)

CHLORAL TO CHILDREN.—Chloral may be given with perfect safety and success to children, in doses of two grains to an infant of eighteen months, of three grains at three years of age, and of ten grains at nine or fourteen. (Ed. of Medical Times and Gazette, p. 367.)

CHRONIC DIARRHŒA IN YOUNG CHILDREN.—Our object in treating these cases is to keep up the nutrition of the body with the smallest possible amount of irritation to the alimentary canal. Farinaceous food must be given with the greatest caution, and will be seldom found to agree except in very small quantities. Even milk must be sometimes dispensed with, and not uncommonly disagrees, even when diluted with water and thickened with isinglass. Liebig's farinaceous food for infants seldom disagrees, even with the youngest infants. In its preparation the starch is already converted

into dextrine and grape sugar, so that the most important part of the work of digestion is performed before the food reaches the stomach. If the patient be a suckling child, he should be strictly limited to the breast. With children under a year old, milk will generally agree, especially if mixed with lime water. (Dr. E. Smith, p. 320.)

DYSMENORRHŒA.—In cases of painful menstruation, not having a mechanical origin, Indian hemp will generally be found to afford relief. It may be given in twenty minim doses of the tincture three times a day, in combination with aromatic spirit of ammonia. (Dr. A. Silver, p. 304.)

FIBROUS TUMOUR OF THE UTERUS.—*Combined Enucleation and Avulsion.*—The following is a method of removing fibrous tumours of the uterus, which Dr. Matthews Duncan, of Edinburgh, states that he has often pursued with success. The margin of the os is first cut freely on each side with scissors. The tumour is then to be seized with a volsella and powerful traction made upon it, fresh hold being taken if the forceps tears its way out, and in some cases two volsellæ being used. At the same time the uterine wall is to be pushed back with the finger. Those forms of tumour which have but little connection with the uterine walls easily come away with a clean and lustrous surface, but those connected by bands of fibrous tissue require considerable efforts on the part of the operator, and the operation is necessarily prolonged. The tumour in this manner is removed by *simultaneous* avulsion and enucleation. The operation cannot lay claim to elegance or brilliance, but it is successful. A great difficulty in the operation is the removal of the tumour through the undilated vagina. (Dr. M. Duncan, p. 315.)

HYSTERICAL INFLAMMATION OF INTERNAL ORGANS.—In hysteria the perverted nervous state of a part, such as the knee for instance, produces such alteration in the vascular state that changes very similar to actual inflammatory ones take place. There are present, heat, pain, and swelling. There is reason to think that what may take place in the knee may occur in an internal organ, such as the lung, resulting in cough, expectoration, pulmonary crepitation, and a condition in which there is dulness on percussion over the chest. (Dr. J. W. Ogle, p. 118.)

HYSTERICAL VOMITING.—*Diagnosis.*—The peculiarity of hysterical vomiting is that the food is returned without nausea, and apparently without effort, as it were by an easy act of rumination. (Dr. J. W. Ogle, p. 113.)

LEUCOCYTHÆMIA.—Leucocythæmia occurring in pregnancy is a disease of much graver importance than might *a priori* be supposed. It is liable to assume an acute form, terminating speedily in death. It is useless to wait for enlargement of the spleen to form our diagnosis, for then the case is hopeless. We may in an early stage recognise the disease by microscopic examination of the blood. The symptoms are rapid pulse, feebleness, languor, and sallowness of the skin. After a time there will be a certain amount of turgescence of the thyroid and submaxillary glands. It is important to recognise the existence of the disease before the period of delivery, as there is always a good deal of hemorrhage after the removal of the placenta, and by being prepared for that we prevent the bad effects of loss of blood upon the already debilitated system. (Dr. R. Paterson, p. 310.)

PHLEGMASIA DOLENS.—*Opium.*—Opium not only relieves the pains of phlegmasia dolens but is actually curative and, that with great certainty. The rule is to keep the pain thoroughly subdued, as the earlier the treatment is begun the more effectual it is. It is well to remember that the first symptom of the disease is usually pain low down in the pelvis at one side. It is generally not severe at first, but it is always accompanied by a certain hardness of the pulse. (Dr. C. C. P. Clark, p. 291.)

PUERPERAL CONVULSIONS.—*Chloral.*—A case is related in which after a dose of thirty grains of chloral the puerperal convulsions which had been previously frequent ceased almost at once. (Mr. R. D. Fox, p. 289.)

Chloroform and Barnes's Dilators.—In a case where the os is small and the violence of the convulsions threaten a speedily fatal termination to the case, the best plan of treatment is to keep the convulsions off by the continuous administration of chloroform, to give time for dilatation of the os by means of Barnes's dilators. (Dr. A. Wiltshire, p. 332.)

PUERPERAL MANIA.—*Chloral.*—If chloral is given in puerperal mania the most successful plan seems to be, judging from a case related, to give it in one or two large doses, of say 60 grains, rather than in smaller and more repeated ones; the object being to procure a sound and prolonged sleep. (Dr. Head, p. 200.)

RIGID OS UTERI.—*Hypodermic Injection of Morphia.*—A quarter of a grain of morphia hypodermically injected in cases of tedious labour from rigid os uteri has the effect of producing

rapid dilatation, in addition to its soothing effects upon the worn out and suffering system generally. (Dr. C. W. Shaw, p. 277.)

SORE NIPPLES.—You will rarely fail to cure sore nipples by applying rapidly a stick of nitrate of silver well into the crack or sore. Afterwards wash the nipple with a little warm milk and water. (p. 334.)

SORE THROAT IN CHILDREN.—*Insufflation of Dry Powders.*—In cases of sore throat in children the insufflation of a dry powder is much preferable to the application of a liquid. Gargles are of course out of the question. A dry powder is more potent than a liquid solution, it can be applied more rapidly and localised more accurately. For this purpose an insufflator may be used consisting of an elastic ball and tube, with an aperture, capable of closure, for introduction of the powder into the tube. The following powders have been employed in this way during a recent epidemic of sore throat in Manchester and its neighbourhood: alum, rhatany, tannin, borax, guaiacum, acetate of lead, calomel, sulphate of copper, and nitrate of silver. If any of the last three be used, from a quarter to half a grain should be mixed with five grains of pearl powder; in the case of the other drugs about five grains should be employed at each insufflation. (Mr. S. M. Bradley, p. 335.)

UTERINE TENTS.—*Difficulty in Introduction of.*—The most common and most annoying difficulty in the introduction of a tent is the result of a flexion of the body of the womb on the cervix; stricture at the internal orifice is produced, and it is almost impossible to introduce a straight tent. The only real escape from this difficulty is to employ a probe to replace the uterus as nearly as possible in its normal direction, and then to slip in the tent by the side of the metallic director. The use of a bent tent is not found in practice to be feasible owing to the stricture at the point of flexion. (Dr. L. Aitken, p. 302.)

VESICO-VAGINAL FISTULA.—*Improvement in Speculum used in Operations for.*—The disadvantage of Sims's speculum is that it cannot be held by an assistant in the exact position desired by the operator for a great length of time. What is wanted is some means of fixing it in position. This can be accomplished by means of a fenestrated blade attached to the speculum, and made to fix over the back of the patient. The blade and the speculum are connected by a screw, by which the exact position is regulated. (Mr. T. S. Wells, p. 326.)

MISCELLANEA.

ANATOMICAL PREPARATIONS.—*New Preserving Fluid for.*—The following answers admirably, and does not cause contraction of soft textures. Arsenious acid, 20 parts; crystallized carbolic acid, 10 parts; alcohol, 300 parts; distilled water, 700 parts. The arsenious acid prevents decomposition, and the carbolic acid prevents the development of cryptogamic vegetation. (M. Méhu, p. 399.)

ANÆSTHETIC PROPERTIES OF CARBOLIC ACID.—Carbolic acid has a striking anæsthetic power. “I employ it at present very commonly previously to the application of caustic to lupus and epithelioma. It benumbs the surface, it dulls the excessive sensibility of the superficial nerves, and it thereby permits the caustic application of our remedies with a great reduction in the amount of pain.” (Mr. E. Wilson, p. 382.)

BICHLORIDE OF METHYLENE.—Mr. Spencer Wells states that for more than three years he has employed bichloride of methylene as an anæsthetic in many operations, and he feels certain that it is quite as effectual and much safer than chloroform, while it is less often followed by vomiting, and headache, and depression. (Mr. T. S. Wells, p. 327.)

CHLORAL.—*The Dose of Chloral.*—There can be no doubt that the dose of chloral should vary with the age of the patient and the amount of suffering to be relieved. A case of uterine cancer was relieved by ten grains three times a day; the dose was increased to fifteen grains with the effect of producing intoxication, and it had to be reduced to ten grains again. The safest plan is to let the primary dose be ten grains, and to increase afterwards if necessary. (Mr. W. Cooke, p. 374.)

Chloral occasionally a True Anodyne.—It appears from a case of neuralgia which occurred at the Royal Infirmary, Edinburgh, that chloral, contrary to the general opinion of its action, may be a true anodyne, relieving pain without producing sleep. (p. 79.)

CHLOROFORM INHALATION.—*Danger from Chloroform.*—The only condition of body which may be diagnosed as especially dangerous for chloroform is that of a weakened and dilated right side of the heart, with enlarged hemorrhoidal veins, varicose veins of the lower extremities, and large, full, yet not tense veins in the other parts of the body. Beyond this our knowledge ceases, for nothing definite is known. (p. 339.)

Prevention of Danger from Chloroform.—Be sure that the breathing is unimpeded, and that no weight of bed-clothes rests on the abdominal muscles. The sitting posture is un-

favourable for the heart, and the lying position for the respiration. On all accounts the semi-recumbent position is the best, as it is generally the most convenient. It is well to keep the body from the beginning to the end of the operation in the same position, for, in experiments on animals it is found that they may be narcotised until the inspiratory act ceases, and yet the animal may recover; but at this crisis the smallest movement, the merest handling of the body will prevent all chance of return of power. Although chloroform should not be administered to a patient whose stomach is charged with food, it is very bad practice to allow the system to become exhausted for want of food before the chloroform is given. (p. 340.)

Death from Chloroform.—If a warm-blooded animal is subjected suddenly to the vapour of chloroform, at a temperature over 70° Fahr., it will often cease to breathe and to circulate blood at once. Again, it is found that a considerable proportion of deaths from chloroform occur within the first minute of its administration. These things show us that it is a bad practice to commence its inhalation too abruptly, or to force on narcotism rudely, against time. The same observation extends to all bodies of the same family, as chloride of methyl, and bichloride of methylene. In these cases it is not the quantity of the vapour absorbed into the blood which kills: the killing is by a primary impression on the peripheral nervous surface from the vapour, and by consequent arrest of the action of the heart from asphyxia of the blood. Various other well-ascertained facts prove that the best plan of giving chloroform is to carefully feel the way in the first minute or two of administration, and then, in the adult to give it freely so as to push quickly into the third degree of anæsthesia. (p. 343.)

There are four modes of death from chloroform. In the first, by the immediate influence exerted by the chloroform on the peripheral nervous system, respiration is for an interval suspended, there is accumulation of carbonic acid in the blood, irritation of the vagus, and consequent arrest of the action of the heart. Artificial respiration offers the best chance of recovery in this form of death, because the irritability of the heart is unimpaired. Nervous irritable people are those subject to this. The second mode of death may be called *epileptiform syncope*; it is instantaneous, and we find the arteries completely empty of blood, and the brain blanched and bloodless. This form of death occurs during the second stage, or that of excitement. The third form of death occurs when, from the slow and continued action of the narcotic,

there is *paralysis of the heart*. This form of death is hopeless, artificial respiration has no effect on it. It is always preceded by intermittent action of the heart. The fourth form of death is a compound one—there is first depression of the heart and system from the chloroform, and then surgical shock is superadded. Hemorrhage may have aided the depression of system. Death here is by syncope, and is often sudden. It is very liable to occur from committing the error of supposing that in small operations it is only necessary to administer a little narcotic vapour, and, secondly, from proceeding to operate while the patient is excited and not insensible. The best means of producing artificial respiration is by Richardson's double-acting bellows. (Dr. B. W. Richardson, p. 349.)

ETHYLATE OF POTASSIUM.—*A New Caustic.*—The ethylates of potassium and sodium will probably be found to be the most effective and manageable of all caustics. They are crystalline substances, in which one atom of hydrogen of absolute alcohol is substituted by one of potassium or sodium. Brought into contact with the tissues they absorb water and are decomposed, the potassium or sodium is oxydised, and alcohol is reformed from the recombination of hydrogen derived from the water. (Dr. B. W. Richardson, p. 377.)

IODINE AS A DISINFECTANT.—Iodine is one of the readiest and best disinfectants. An aqueous solution forms an excellent application to ulcers and wounds. It is, however, most suitable of all for use within the sick bed. A little iodine in a box and covered with muslin, placed under the bed-clothes, will keep the bed quite free from any offensive odour. (Dr. B. W. Richardson, p. 386.)

MECHANICAL DIVISION OF MERCURY.—With the mercury shake a very small quantity of tincture of tolu, and the former will be reduced rapidly to a state of minute division which is easily mixed with fatty and other ingredients. (Mr. J. Calvin, p. 382.)

PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

ART. 1.—THE ORGANIC GERM THEORY OF DISEASE.

By JABEZ HOGG, Esq.

[Organic germs are different from simple organic particles, and before discussing a question such as that which forms the subject of this article, it is necessary to distinguish in one's mind between these terms. This subject has been brought prominently into notice by the experiments of Professor Tyndall in a lecture recently delivered.]

It is not my intention on the present occasion to attempt a refutation of Professor Tyndall's method of demonstrating the presence of organic germs in the air, because, although he looks upon his experiments as exact, he thoroughly ignores the physiological aspect of the question, as well as those of a more palpable nature—such as the large amount of organic life, spores, &c., held in solution in all our potable waters, and that to these, among other causes, we had far better look for a solution of the difficulties which surround diseases of the class mentioned. The Professor's statements, in short, appear to me to be a series of bold assertions, wanting in exactness or put forth by a newly converted enthusiast, whose notion of dealing with facts is to square them with his own theories. I cannot believe that Professor Tyndall is ignorant of a series of valuable experiments made by Dr. Angus Smith, who, it is well known, has been long engaged in determining the relative condition of organic and other matters in the air of towns, and its probable effect upon the health of the inhabitants. This chemist and physicist has found that the chief cause of the insalubrity of the air of towns consists, not in "organic germs," but in the emanations from human beings too closely packed together, the presence of noxious gases generated by coal or thrown off by large manufactories. These tend to saturate the air with matters of the most injurious kind—as sulphuretted hydrogen, sulphuric and hydrochloric acids, ammonia, chlorides, and albuminoid matters—which are far more injurious to health and life than

“organic germs.” Dr. A. Smith therefore withholds his assent to anything like an “organic germ” theory, because he believes it has not been shown by its advocates to have any relation whatever to disease, and is likely to divert attention from causes far more important. Professor Wanklyn has also proved by his ammonia process that the total quantity of organic nitrogenous matter passing out of the lungs and held in solution in the form of watery vapour during the space of twenty-four hours in health amounts to about three grains. In disease it increases; but even in health the quantity of free ammonia varies considerably, and Dr. Ransome has ascertained that a larger quantity of organic matter is thrown off in Bright’s disease and some others, while in catarrhs, measles, diphtheria, &c., a great deficiency takes place. This fact scarcely chimes in with the “organic germ” theorists, who have asserted that large quantities of albuminoid matters, vibrios, &c., are found in the air-passages in catarrhs. Then, with regard to the filtration of air through cotton wool, does this do more than arrest the moisture given off from the lungs and saturated with ammonia and other salts? I believe not; it simply frees the expired air from all ammonia. The Professor’s idea, however, is by no means new either to the chemist or physician. It is now several years since Professor Tomlinson, of King’s College, showed how impossible it is to keep any vessel chemically clean, or even decently free from the dust floating about in a closed-up room. He found that corking up bottles did not prevent the entrance of particles of organic matter. After many trials to exclude the dirty atmosphere he tried cotton wool, and found by placing a pledget of this material quite loosely in the necks of bottles or glass tubes they remained perfectly clean for many days. Professor Tomlinson by employing flasks or bottles thus prepared was also enabled to delay the crystallisation of saturated solutions of salts to an almost indefinite period. He excluded in this way all particles of inorganic matter which at once form a nucleus of crystallisation, but such particles of matter are easily detected, and are certainly not to be confounded with “organic germs.” The members of our profession have not lagged behind in a matter of this kind, but on the contrary have taken the initiative in the use of cotton wool inhalers for those engaged in deleterious manufactories, or in places where a large amount of organic or mineral matters are given off. Dr. Angus Smith in his report upon the air of mines, 1854, particularly dwells upon the danger to the health of the miner, produced by taking into the lungs through the open mouth of a large quantity of coal-dust and other matters. “If,” he says “as you approach the entrance of a pit, a gleam of sunlight happen to play across it, you will at once perceive an immense quantity of solid matters issuing

forth in an endless stream. The impure air of the mine is loaded with these solid particles, which, when caught and submitted to microscopic examination, are found to consist of fine particles of coal, crystalline bodies, &c., and when issuing from iron mines in addition to the fine metallic atoms, have the solid products from gunpowder explosions, arsenic in small quantities, and sulphides of various metals. With a given quantity of inspired air the miner takes into his lungs from sixty to eighty grains of such impurities each day, so that it will be readily understood that such dust and dirt must in a very short time exert a very injurious effect upon the lungs and other organs of the body." To prevent the entrance of such matters into the mouth and lungs Dr. Smith proposed the use of a simple respirator, made of a layer of cotton wool, placed between wire gauze, which could be made for a few pence. But it would be an idle waste of time to dwell upon anything so palpable, and which bears no proportion to the ordinary condition of the atmosphere. There is another point I must say a word upon: it is the physiological part of the question which, as I have already said, has been entirely ignored in this discussion. Professor Tyndall has failed to notice the important fact that the respiratory tract is well taken care of, being freely supplied with cilia and ciliated epithelium, which remain in action, sleeping or waking; by their agency a sort of churning process is carried on amply sufficient not only to arrest the further progress of any foreign body, but probably to kill "organic germs," and effectually prevent their germination in any of the internal organs. Or when particles of matter enter in large quantities, have we not additional means provided for their expulsion, in the act of either coughing or sneezing? Much of even coal-dust inhaled collects in the throat, there becomes entangled in the mucous secretion, and is ultimately expelled by expectoration. I therefore very much doubt whether the change observed by Professor Tyndall, when he exhaled through cotton wool, was due to the cause he ascribed it to—namely, filtration of the air from organic germs; it was undoubtedly due, as I have before said, to a retention of moisture, carbonic acid, &c., which under ordinary circumstances is thrown off from the lungs; at all events the conditions of saturation would be so materially changed by the interposition of cotton wool, and so arrest the salts of ammonia and sodium chloride, held in solution, that a different luminous cloud would certainly result. Indeed he seems to feel this difficulty, for he says, "that the condensation of the aqueous vapour of the breath is shown by the formation of a luminous white cloud of delicate texture. It is necessary to abolish this cloud, and this may be done by drying the breath previous to its entering the beam."

Towards the close of forcible expiration the breath would be drier and freer from moisture as well as the salts of ammonia and other salts usually given off, and this should be taken into account. But would it be possible to judge in this way, when all organic germs were filtered out of the air? Are there not some so minute that they cannot be filtered out? We shall presently see.

Those who know little of the microscope and the perfection to which the modern instrument has attained believe that organic germs such as Tyndall spoke of in his cloud of dust cannot be seen by its aid, nor appreciated in any way, except by watching their play across the path of a ray of solar or electric light. This is not the fact; it has long been a practice with microscopists to expose glass slides in suspected places or atmospheres, and, in a very short time, a large crop of various minute particles are deposited. If I take an ordinary slip of glass, and smear it over with glycerine, and expose it for a moderate space of time either in my room or in the open air, I find, when examined under the microscope, a quantity of small particles deposited thereon, such as articles employed and in domestic use at the moment of exposure would throw off, chiefly consisting of mineral and vegetable substances—as fragments of coal, granite, brought in on the dress or shoes from the street, vegetable hairs, cotton, as well as wool fibres detached from the clothing; these are often mixed with a few starch granules from the bread, and occasionally a few spores of fungi. In the house the latter form but an inappreciable proportion, while in the open air we often take a good deal, and during the warm damp weather, peculiar to some periods of the year, a larger quantity of fungus spores and particles of vegetable hairs will be deposited on the slides. If I expose a glass slip over a sewer, I sometimes obtain a variety of spores, circular, ovoid, and jointed, or dissepimented, and mixed with ammonia nitrate, which crystallises out after the glass has stood by for a few days. By employing a more scientific method as an aspirator, which draws in a larger quantity of air in a given time, Pasteur and others collected the same kind of substances. If I put a small quantity of distilled water into the bottle before the air is drawn through by the aspirator, I also get, in the course of a few days, some of the lower forms of animal life developed in the fluid. This experiment, as you know, seems to prove the spontaneous generation theory, heterogenesis, of animal life.

The microscope has clearly demonstrated the nature of these various substances floating in the air, and it is more than probable that a few escape detection, either from their extreme minuteness or transparency; but those who have investigated the subject will agree with me that it by no means follows that

the air is filled with organic particles, or contains more than a very small proportion of "organic germs." Dr. Angus Smith determined the relative proportion of organic matter in pure air to be 1 grain in 200,000 cubic inches, while the most impure air of towns contains often as much as 1 grain in 8000 or 10,000 cubic inches of air. For weeks together, at particular periods, organic germs, as the spores of fungi, will be almost absent, or, at all events, they are so extremely difficult to trap that we fancy them absent. Some twelve years ago, when I was engaged with my friend, Mr. Hunt, in an investigation of the so-called fungoid diseases of the skin, in a very large proportion of the cases I discovered evidences of sporules and mycelium of fungi. During a later investigation conducted about two years afterwards, I noticed a remarkable absence of anything approaching to fungus spores. A very few cases were discovered, most of which were old, one a persistent case of favus, which had, for a long time, been under treatment. I know not what explanation to offer of such a fact, except that there appeared to be a change in the type of diseases under treatment at the time; probably, due to the state of the atmosphere. Every step in such an inquiry is often surrounded by the same incomprehensible difficulties. We can no more understand these floating germs than we can how the perfume of a flower is diffused through the air, or how a grain of musk should give off its peculiar odour for the space of twenty years, and not become perceptibly diminished in bulk. We are equally unable to explain why out of twenty persons breathing a loathsome air one will breathe in a fatal dose, and nineteen escape the malarious poison. I must confess I do not believe that if the twenty were breathing through cotton wool filters the relative conditions of health and disease would have been in any way disturbed. Aristotle found no difficulty in believing, and inducing others to believe with him, that worms and insects were generated by dead bodies, and it was only towards the end of the seventeenth century Redi succeeded in demolishing this theory, and proving that worms and insects which appear in decaying bodies are produced from the ova deposited there by the mature parent. It was, however, thought to be altogether preposterous to suppose that putrefaction could produce an insect (neither could it), and this explanation was at the time utterly rejected as fallacious. Driven from the insect world where such an hypothesis could have no chance of success, the disciples of Aristotle sought refuge in the world of fungoid life, or "organic germs." But here we arrive at an immense gulf, which requires to be bridged over before we come to the portal of truth. I have no doubt that the hypothesis of the production of disease by "organic germs" first obtained credence simply because we know

of something analogous occurring in the flight of insect life, and the propagation of swarms which inflict blight on vegetable life. To associate such a phenomenon with the occurrence of disease in animal bodies is most unreasonable and unsatisfactory. From an "organic germ" to a "specific germ" theory seems to be a natural transition, and certainly the most plausible affiliation of a disease with the "specific germ" theory is cholera; but even here we find opinions becoming more and more divided. With those who have given time and attention to the subject, it is quite a matter of uncertainty whether the infection is conveyed in the air, held in solution, in the potable waters, or taken in with the food, such as rice, the staple commodity of the native population of India, which is sometimes attacked by a fungus. If we assign a specific germ theory to cholera, we have to deal with a migrating malaria, a wandering cause of disease not confined to hospital, house, or district, capable of being diffused through the atmosphere and conveyed along vast tracts, affecting different places with a varying intensity, which no known conditions of earth or atmosphere will explain; but nevertheless possessing the power of reproducing itself, so as to spread the disorder by fresh creations of the original conditions which produced it. Microscopical and chemical examination of the atmosphere of the wards of Hospitals in which large numbers of cholera patients have been treated, has afforded no reliable solution of the question. Mr. Rainey and Dr. Thomson, in 1855, made every attempt to isolate the supposed cholera contagium in the wards of St. Thomas's during the epidemic visitation of that period, but without success. They only discovered particles of vegetable hairs, coal dust, epidermic scales, starch, with occasionally a few spores of fungi; but the results obtained were thought to be unsatisfactory, nor did there appear any grounds for the belief that these organic germs had anything to do, directly or indirectly, with the prevailing disease. The remarkable coincidence of the prevalence of "rusts" and other fungi, noticed by many observers during the first outbreak of rinderpest, led many to suppose that this disease was due to the spores of fungi; but this opinion was soon exploded.

Dr. Tytler, I believe, first attempted to connect cholera with diseased food, during an epidemic visitation at Jessore, in 1817. He asserted that it was occasioned by the consumption of unsound rice. But when, in 1833, he exhibited his specimens to the Medical Society of London, they proved to be "ergoted rice." Now, although rice infected with ergot has been known to produce fearful results, the symptoms of poisoning, as you are aware, differ widely from those of cholera. In 1861 a gentleman lost six horses in a very sudden and suspicious manner. His belief was that they had been poisoned, and the veterinary

surgeon agreed in this; but upon making a careful post-mortem he could find no trace of poison. The food was then examined, and some oats attracted attention. My friend, Professor Tuson, received a supply, and sent me some for examination. I noticed that the grains were matted together in lumps, by a sort of cobweb-like material. Upon breaking them up a blackish-looking powder was deposited on the paper; placing some of this under the microscope, "bunt" and other spores were detected, and I was able to help in clearing up the mystery, and confirm the suspicion, that death was due to a cumulative poison swallowed in large doses in food, which starved, instead of nourishing the animals. Numerous well attested instances of a similar kind might be given if it were necessary, but it would be merely a reiteration of a well known fact, that toadstools are poisonous, and mushrooms edible and nourishing.—*Medical Times and Gazette*, June 18, 1870, p. 659.

2.—ON THE LOCAL AND SPONTANEOUS ORIGIN OF ENTERIC FEVER.

By Dr. CHARLES E. PRIOR, Bedford.

[Hardly any subject is more interesting than that of the origin of typhoid fever, and few more important. Such exanthemata as scarlatina and variola, undoubtedly originate in contagion alone. On the other hand, whilst typhoid fever is certainly in most cases originated by contagion, it is probable that it does in some originate spontaneously.]

Some febrile diseases are of spontaneous origin—of local origin. Granted. What are those diseases? Have they any peculiar characteristics? Do they differ in any way from the exanthemata? They have; they do so differ. Intermittent and remittent fevers form a group by themselves: their origin in malaria is unquestionable. The non-connexion of that malaria with foul odours or organic refuse has been repeatedly demonstrated. It has been found in its most deadly form on the barren sands of the Tagus, or the rock of Gibraltar; in the stony ravines of India, where scarcely a blade of grass can grow, or a trace of organic matter exists. I have myself met with it in the elevated valleys of the Malvern range. It is the specific gravity of malaria alone that indicates its existence; to chemistry, to smell or to vision it is alike unknown.

It is the characteristic of the fever of ague and of the paludal form of yellow fever to be incommunicable by contagion, nor have they any typical eruption; in fact, their non-contagion would appear to be almost a law of nature for the preservation

of our species. Were it otherwise, in the words of Dr. Bancroft, "every dunghill, every collection of decaying animal or vegetable matter, might become the source of a fresh contagious and pestilential disease, and mankind, surrounded by such accumulated perils, would soon cease to exist.

Never having seen a case of yellow fever, or resided in a hot climate, I speak with diffidence on the subject. It would appear, however, that there exists in tropical latitudes a certain specific form of the disease, communicated by contagion and continuous in type. If this be so, it may eventually turn out to be a disease having the same relation to the paludal disorder that our own enteric fever bears to ague. Possibly, with further research a typical eruption may be discovered. Be this as it may, the grand fact remains, that in England at least, and probably in other countries, the intermittent fevers of local or paludal origin are non-contagious and non-eruptive.

It would be begging the question to say that the converse of this is true—namely, that eruptive contagious fevers are not of local origin; but this much may be granted—(1) that they are not of paludal origin; and (2), a point which I have discussed with some minuteness, that enteric fever is beyond all question a contagious disease,

"Typhoid fever," says Piedvacke (p. 124), "reigns everywhere—in the dwelling of the rich as in that of the poor, in places low and damp as in places high and dry, in town as in country." Again: "Pathological observation teaches us that the affections which are the product of external and well-demonstrated causes are but very rarely, perhaps never, contagious. A simple enumeration would be sufficient to prove it." (p. 17.) Again: "Some local epidemics have appeared produced by emanations disengaged from vegetable and animal matters in putrefaction. But it is easy to demonstrate that the most part are independent of this cause. Hygiene has hitherto made little progress in the country. One often finds there dunghills before the doors, and stinking water; dirt reigns in a great number of rural habitations. But typhoid fever is not in conformity with these circumstances: one sees it in houses rendered, by position and arrangement, most salubrious; in high places as in low, in town as in country." (p. 22.)

To this the experience of M. Gaultier de Claubry, in his report to the Academy (1848-49) on the epidemics of France, corresponds, and the testimony is of great value, as it comprises the experience of 162 communes in 28 departments, and of 122 separate reports on nearly 10,000 cases. "Relatively to the conditions of topography," says he, "the situation of places has thrown no light on the causes of the disease. A similar

remark is applicable to the state of salubrity or of insalubrity of the villages where the disease has shown itself, as also to the variable degree of ease or of misery of the population who inhabit them. Singular as such an assertion appears, it is the rigorous expression of the numerous facts contained in the report.

There yet remain for consideration two branches of the argument—namely, the argument from experiment, and the argument from experience.

Experiment.—The late Dr. Barker of Bedford endeavoured, by exposing animals for shorter or longer periods to cesspool air in a box constructed for the purpose, to ascertain the connexion between the gaseous products of fæcal fermentation and certain febrile diseases. Four dogs and a mouse were thus exposed. In all the dogs diarrhoea and vomiting, more or less severe, set in; but all the animals, with the exception of the mouse, recovered. Beyond the symptoms named, there was no reason to suppose that the disorder produced was any stage of enteric fever.

Other observers and the same gentleman also have exposed animals to various gases the products of decomposition—namely, sulphuretted hydrogen, carbonic acid, ammonia, and sulphide of ammonium.

Fifteen experiments on sulphuretted hydrogen are recorded by Dr. Barker and by Dr. Richardson, performed on dogs, hedgehogs, and birds. In most of the cases accelerated respiration, jactitation of the muscles, tremors, insalivation, and disorder of the bowels appear to have ensued, passing, if the experiments were pushed further, into narcotism, coma, and death. Careful post-mortem examinations were made in several of the cases, but in none was the characteristic intestinal lesion of enteric fever discovered.

Of the well-known effects of carbonic acid it is unnecessary to speak.

Dr. Barker also made eleven experiments on sulphide of ammonium introduced into the box containing the animals (dogs, jackdaws, and hedgehogs). General distress, lachrymation, diarrhoea, and salivation were the principal symptoms produced. Two dogs and one bird were poisoned, and their bodies were examined after death. There was nothing in the post-mortem appearances characteristic of enteric fever.

It appears to me that there is one grave deficiency which vitiates all these experiments. It is this: we have no evidence that any of these animals are susceptible of typhus or of enteric fever. In fact, I never heard of any domestic animal that had contracted the disease, unless it be the pig; and surely, if the local origin of enteric fever be not a myth, the conditions of piggy's existence ought to be causing daily victims.

The only animal in whom enteric fever can be studied is man. To experiment upon the human species is out of the question; and therefore it only remains for us to select from the records we possess those histories of the exposure of a healthy population to the products of decomposition supposed to be most capable of generating enteric fever, which, from their scale and circumstances, realise most fully the conditions of an experiment. Such a history is that of the removal of the Cimetière des Innocens at Paris in 1785—a space of two acres, which contained the remains of at least half a million of bodies in various stages of decomposition, yet which was carried out during two years without the slightest accident or any appearance of epidemic disease among the workmen. Such again is the great stink—if I may so term it—of 1858, when the Thames became in such a revolting condition as led to the enormous works of the metropolitan main drainage; yet, according to the testimony of Dr. M'William and others, the health of the police employed on the river, and of the population along its banks, was absolutely unimpaired, and no epidemic ensued. Such too is the history of the horrible Montfaucon, whose vile odours, arising from the bodies and refuse of thousands of dead horses, dogs, and cats, and from large pools of excrement collected from the entire city of Paris, were perceptible at two miles' distance, and were absolutely insupportable on the spot to the uninitiated; and yet, according to the testimony of Parent du Chatelet, the workmen employed there enjoyed the most robust health, and their families have shown no peculiar tendency to enteric fever. Besides observations of this magnitude, a few experiments upon animals with poisonous gases sink into insignificance.

It has been conjectured that sulphide of ammonium may be the peculiar deleterious agent which produces enteric fever. But nothing in the way of proof exists: no animal which has been exposed to the vapour has shown the usual symptoms of the disease after the ordinary period of incubation. In fact, I think myself justified in saying that the experimental proof of the spontaneous origin of enteric fever utterly breaks down.

Experience.—The last appeal lies to that most fallacious of all tests, “experience.”

Many cases from many authorities have been cited in illustration of the spontaneous generation of enteric fever from faecal fermentation, vegetable decomposition, and foul odours of all sorts. The late Dr. Barker collected thirty-six cases of the sort; but the diseases are not well discriminated. In fact, I believe that in many of the cases they are not correctly described, some of them having been gathered from non-professional sources; the history of some others is, to my own

knowledge, incorrectly stated; and some are from professional men who were apparently unaware of the distinguishing characteristics of typhus and enteric fever. Many of them also are far too short; but, on the whole, there appears reasonable ground to suppose that about one-half of the number were cases of enteric, or, as it is termed, "typhoid" fever.

To Dr. Murchison, as the great apostle of pythogenesis, and one who has thereby, according to Dr. Aitken, "rashly committed science to an hypothesis of a highly doubtful nature" (p. 413), one naturally turns for the best evidence that can be produced in support of his dogma. Dr. Murchison has collected 13 cases, which are set forth with considerable detail. Of course it is out of my power to quote them in a paper of this sort. They include the Croydon and Windsor epidemics, the Clapham School case, the Westminster epidemic, alluded to by Dr. Watson, and others equally singular.

Many of these outbreaks may be accounted for on the explanation of Dr. Budd—namely, the transmission by the sewers of the poison from intestinal discharges. Some of them, such as the "Westminster fever," have been a matter of question as to whether they were fever at all. There still, however, remains a puzzling residuum. But then, on the other hand, we must consider the forcible facts brought forward by Dr. Chisholm, Dr. Hughes Bennett, and others, and briefly alluded to in this paper, in proof of the non-origin of enteric fever from simple fæcal fermentation. It is fair also to state that the experience of Piedvacke gives a certain proportion of cases in which the disease could not be traced to contagion, and appeared of spontaneous origin, children in the cradle being in two or three instances the first to be attacked, and the disease spreading from them. "In the country I noticed, out of 312 cases, 12 typhoid fevers at least where I acquired certainty that there was no anterior connexion, direct or indirect, with other patients; and they have been the stem from which sprung a great number of others." (p. 127, 128.) Piedvacke, however, does not name any peculiar connexion between these cases and defective cleanliness; on the contrary, he expressly denies such an origin.

Such is a brief review of the case from experience. It appears to me that there are certain considerations of which gentlemen who favour us with their observations are too prone to lose sight. Has the explanation of Dr. Budd been sufficiently considered, and has its applicability to the case in question been tested? Is it the rule, I would ask, or is it the exception, even in diseases of the most markedly contagious nature, to obtain an explanation of the origin of the disease? When is it so obtained in a case of scarlatina? How often in typhus, or

even in small-pox? Yet what medical man for that reason doubts either their transmissibility or their transmission? The fact is that these diseases are always in existence around us, but their method of diffusion is far too subtle to be traced under all circumstances.

For a hundred and twenty years this country had remained exempt from rinderpest, sanitary defects notwithstanding; and again now it is verging towards extinction. Yet every now and then see how the cases crop up: one in Windsor, after seven months' intermission; others in Derbyshire, after an interval nearly as long; another in Wales, or it maybe even in Ireland. But do we therefore assume the spontaneous generation of rinderpest?

It is one of the laws of nature that animals and plants which propagate by continuous succession should appear in alternating periods of profusion or scarceness. The deeper the knowledge of the naturalist, the more instances will occur to him. The wasp—nay, the very birds are subject to this law. Whence came the humming-bird moths which appeared in such remarkable numbers in the summer and autumn of 1866?—whence the clouds of locusts or of gnats?

But when we descend to the lower forms of life observation is fairly baffled. Their rapid growth, their minute spores, their subtle powers of penetration, their mysterious disappearance and equally mysterious return, their wonderful migrations, are such as the present powers of man are totally incapable to follow—scarcely even his philosophy to comprehend.

At this point I think it fair to leave the present subject. From what I have had the pleasure of laying before you, the following conclusions occur to me with more or less of distinctness. That some of them have not been worked out as they should be, is due partly to the limited time at my disposal; partly, it may be, to an inadequate rendering of what presents itself, nevertheless, forcibly to my mind.

1. Spontaneous generation of plants and animals is a figment which is constantly receding as means of observation extend and improve.

2. Spontaneous generation of parasitical diseases is a figment.

3. The exanthemata may be a low form of fungoid life.

4. Small-pox, a contagious exanthem, is proved by indisputable negative testimony to be incapable of spontaneous generation.

5. Several other contagious exanthemata cannot originate spontaneously.

6. Enteric fever is a contagious exanthem.

7. Febrile diseases of local origin are not contagious.

8. Experiment gives strong evidence against the spontaneous origin of enteric fever.

9. Observation, as usually conducted, is a treacherous and insufficient test of the origin of febrile diseases.—*Lancet*, Sept. 3, 1870, p. 327.

3.—ON THE PROPAGATION OF CHOLERA AND ENTERIC FEVER.

By Professor MAX VON POTTENKOFER.

[It is Professor Pottenkofer's opinion that we must seek elsewhere than in impure drinking water, contaminated with excrement, for the local causes of fever and cholera. How little this can be the cause, may be shown from the following quotation from the treatise of Buxbaum on the typhus in the barracks at Neustift in Friesing.]

“I have practised about ten years in a neighbourhood in which the drinking-water must have been under all circumstances very impure, without my being able to prove it by analysis. It is the neighbourhood of Eichstadt, in which in consequence of its geological situation there is the greatest scarcity of water. This is particularly the case on the ridge of hills situated north of Eichstadt. Here, as in the whole of that region, the formation is the white Jura limestone, which extends as an undulating table-land, having neither brook nor stream. For as the arable soil lies more or less immediately on limestone, either stratified lime, or dolomite, or calcareous rock, the atmospheric precipitations disappear without leaving any traces through the numberless clefts in the depths of this limestone, coming again to light at a more or less distant valley as permanent or periodical springs. One sees in the field or wood of this plateau numerous funnel-like caverns, which gather at a considerable depth all the rain-water collected from its neighbourhood, and convey it bubbling to the bottom. There are therefore in this region not only no streams or brooks but also no wells. Frequently the drifted clay had formed an impermeable stratum in some trough [among the hills]. Here and there are found wells containing water to the depth of a few feet, generally in private possession, and closed by a lock to preserve its small quantity of water for the possessor or privileged persons. With the exception of these cases all the inhabitants must obtain their water by collecting the rain-water into cisterns by means of gutters.

“In a history of the town and district of Eichstalt by the district school inspector, the Rev. Mr. Hotte, of Wachenzell, it

is said on this subject (p. 128):—‘The inhabitants are allotted the rain-water in the gutters, which is named sparrow-water (*spatzenwasser*), because the sparrows also make free to drink from the gutters. However, this water is, when, as occasionally happens, salt or ashes are thrown into the cisterns, tasteful, and certainly more salubrious than others containing saltpetre or sulphur or iron.’”

It will be seen that the author here gives the opinion of the inhabitants of the place, who consider the sparrow-water more healthy than that from more common sources. For as they have long observed that they are not exposed to so many diseases as their neighbours, they have believed that they derive health from their cisterns with as much propriety as those who decry the elements of disease in their drinking-water.

“That this sparrow-water cannot be deficient in organic material may be taken for granted without analysis; for rain-water collected from gutters into shallow cisterns, and often stored up there for a long time in dry summer or cold winter months, must indeed become rich in organic matters. It, in fact, generally swarms with all sorts of little animals, even visibly to the naked eye, and must for this reason frequently have salts and ashes mixed with it to diminish the excess of organic life. And yet there probably is scarcely a region more exempt from all the so-called infectious diseases than that high range. During a ten years’ practice there, I have, besides catarrhal affections, rheumatism, and inflammatory diseases, observed no acute illnesses, nor any cases of typhus. The intermittent fever, which in the years 1856-59 very frequently visited the inhabitants of Altmühlthal, I have never seen in that plateau. But the most remarkable example of the innocuousness of drinking-water rich in organic matters is the so-called black water, which in the district in question is given to the cattle, particularly to the horned cattle, in order to save the sparrow-water for the use of the men. This *schwartzwasser* is obtained by collecting in one or more of the lower places of the village the rain-water which streams in all directions from the roads, dunghills, and the like. Here in this artificial black lake ducks and geese and swine sport themselves, and the animals come to drink. Professors Drs. Holzner and Lindner were kind enough to submit to microscopical and chemical investigation some of the water, and the result is annexed to my report. I obtained the sample from the district school inspector in Wachenzell, the Rev. Mr. Hotte, who sent me by letter as follows:—

“The black water reservoir of this place (Wachenzell) lies almost in the centre of the village, in a large natural excavation called a lake, which is supplied by rain water. As all

the dung heaps lie there free and exposed, so not only does a heavy rain carry with it the liquid manure into the lake, but the same flows there almost constantly till the weather becomes too dry, whence the lake obtains the colour and quality seen in the accompanying samples. I observe that at this moment, and at times of very long drought, the water is much thicker than that sent. Now from this lake the horned cattle drink daily, and ducks and geese swim, and the horses are washed there; consequently, the smaller the influx in dry weather, the richer the contents, the blacker the water.

“The horned cattle, which were accustomed only to clear water, when they come here objected at first to the black water, but gradually come rather to prefer it to the rain-water of the wells. Lately only the horses drank it (the clean water), but they too in the scarcity of water contented themselves with the lake water. All the animals which drink this water are healthy, nay, the farmers go so far as to affirm that this water is more wholesome for them than the rain-water. Nothing is known here or in the neighbourhood of diseases of animals. And yet this same black water is here the general drink for animals over the whole of our mountains, from Schernfeld to Enkering, as well as on mount Irfersdorf, from Kipfenberg to Beilngries. For the summits of the hills mentioned have no spring-water, they are supplied only from gutters, and the so-called lake is in every village the general water reservoir. A farmer in Tornhüll had one immediately between his stall and dung heap; all his animals drank therefrom, and they always enjoyed the best health. When I stated to some farmers that I would send some of the water away for examination because it was not thought by scientific chemists to be harmless, they answered only by a contemptuous smile, as if there could be any doubt about a matter which appeared to them self-evident.” “This communication of the Rev. Mr. Hotte I can confirm after many years’ experience. I have observed with astonishment this foul water and the strong horned cattle which sipped so contentedly the fluid, which was regarded by the inhabitants as strengthening broth. I can remember seeing in Souversholtz at a prosperous farmer’s a well near the dungheap, which appeared to me by its position and the fluid it contained designed as a proper receptacle for liquid sewerage. Knowing the general neglect of the liquid manure by the farmers there, I was very much astonished, and expressed to the owner my approval of his being a praiseworthy exception, and collecting his liquid manure for the field. He at first did not understand me, but on taking my meaning he assured me with the usual cunning smile that this supposed liquid manure was worth more to him as a drink for his cattle.

“ If we observe now the results of microscopic and chemical examination of these waters and the quantity of organic matter which they contain, and consider also the fact that certainly this water has already been used for hundreds of years by the animals dwelling in that district, and that these animals are thereby not only not diseased, but, on the contrary, enjoy an exceptionally good health, we can hardly any longer accept the hitherto received opinion that a drinking-water which contains in one litre 80-100 milligrammes of organic matter must necessarily be pernicious to men.”

Professor Dr. Lindner has examined this black water, a sample of which Dr. Buxbaum sent to Freising, and found:

“ This water was of a brownish colour, and rapidly passing into green; it was completely opaque. Its odour was stinking from sewerage, its reaction alkaline. On evaporation it gave the peculiar odour of cow's urine. The greater part of the sediment was of an organic nature.

1 litre of water gave	1.165	gramme of sediment,
	of which 0.285	„ was inorganic,
	0.880	„ organic.

Professor Dr. Holzner remarks on the microscopic examination of the black water:—“ The dark brown bodies are partly made up of colouring matter, partly putrefying substances, partly of different kinds of diatoms of the genus *Navicula*, the green grains of single-celled *Algæ*, or colonies of cells, all containing chlorophyll enveloped in a general pear-shaped membrane. The black bodies are spores, the brittle episporos of which are granulated and black coloured. Besides the vegetable bodies, one finds a comparatively large number of infusoria and wheel animalcules. The mixture both of organic and inorganic matter is enormous in comparison with that contained in the dirtiest well water.”

There are, then, places where, with the worst drinking-water, there is at the same time immunity from epidemic diseases, and therefore, however often bad drinking-water and epidemic disease coincide, the conclusion that there is a casual connexion between them does not of necessity follow, for the effect can in all cases proceed just as well directly from the soil as from the water.

By this I do not mean to say that we should now drink black water, or that we might drink it unharmed; on the contrary, we know the purer water to be better, and I am convinced that both men and animals on the Jura plateau at Eichstadt would be much more healthy and stronger if they, in addition to their soil, which is so unfavourable to the *materies morbi* of certain zymotic diseases, they had also good drinking-water. But I venture to bring forward these most remarkable

facts, the truth of which I can guarantee, to show that a drinking-water, notwithstanding its demonstrably containing dung-water (*mistjauche*) is still incapable of engendering certain epidemics or of favouring their spread. The germs of epidemics and epizootics are certainly often conveyed from the valley of the Danube and Alt Mühl river to the heights of the Jura plateau, but, as experience shows, have never been able to strike root there, although the drinking-water both of men and animals was surely sufficiently contaminated with decomposing organic matters. The horned cattle, in particular, drink a water in which all the refuse from the surfaces of the filthy villages are mingled together in one common pool. These facts appear to me of a nature to lead etiological investigation away from false tracks into the right path.

The drinking-water theory appears to me at present in a transition stage, which will result in a perfectly natural manner in its passage over into the soil- and ground-water theory. The drinking-water theory cannot do without the soil, with which men come in contact essentially in two ways—through the water and through the air of the soil. It was quite natural that our attention should be first turned to that which is most perceptible to our senses—viz., the water, which we can see, feel, and taste—and that we should leave unnoticed the air which we cannot directly by our senses detect in the soil, although it makes up more than a third of the volume of a dry porous earth which is able to sustain the heaviest building, and from diffusion, variation of temperature, and the mechanical movements of the whole atmosphere it must be in a state of continual motion, though this may be not sufficient to blow out a light or carry the hat off one's head. It has assuredly been by a great error or a great oversight that one has always hitherto imagined that the air ceases and another element—earth—begins at the ground on which we firmly tread, when the soil is more pervaded by air than water, and the air in it is much more free to move than the water.

We know now, from the observations and enquiries of distinguished philosophers, that the air is able to support and carry along particles and organic germs of extreme fineness in comparatively great multitudes, which give rise to fermentation, putrefaction, and other processes, according as they find a suitable substratum. Might not the air in its passage through different strata of earth bear with it and bring to the surface that which may be able to derange our health?

Our dwellings stand as hollow bodies on the ground, as we place a glass bell over a volatile substance of which we would prevent the extension to the atmosphere. The air-circulation in a house is more insignificant than in the open air, so that all

emanations from the soil become more collected and concentrated in the air of a house. We live in the air above the soil, and the greatest part of our lives is spent in dwelling-houses, and we probably use a disproportionately larger quantity of air than water. An adult breathes in twenty-four hours something over 8000 litres of air. The weight of this amounts to about 10,320 grammes, or more than 20 lbs., whilst we take during a day at most 2 to 3 litres, *i.e.*, 4 to 6 lbs. of water. If, therefore, hurtful matters become mingled in the least degree with the air, they come proportionally in much greater mass in contact with our organism, not, indeed, merely in the lungs, but also over the mucous membranes of the first portions of the air-passages which serve also as food-passages, amounting quantitatively to even more than if we drank freely of a contaminated water. In my opinion, we are supplied with undoubted facts not as to the drinking-water, but the soil itself. We must study the organic processes in the soil, and seek to find what it at different times and under different circumstances gives up to the air. Almost everything in this direction is enveloped in an obscurity which no ray of scientific light has yet penetrated. I only claim for myself the credit of having collected and established facts which necessitated inquiry in this direction, and finally pointed it directly to the soil.

In such inquiries, to find new aspects and methods is now more useful than to think how a theory no longer tenable can perhaps be still upheld.—*Medical Times and Gazette*, June 25, 1870, p. 685.

4.—ON THE TREATMENT OF SCARLATINA.

By W. C. WILLIAMSON, Esq., F.R.S., Professor of Natural History in Owen's College, Manchester.

About the period when my attention was first directed specially to this subject, the treatment of scarlatina by ammonia was attracting notice. The success which was said to have attended the adoption of this plan suggested to my mind the possibility of preventing the lowering of the vital energies by the free and bold administration of stimulants from the very commencement of the attack, instead of waiting until symptoms of depression began to manifest themselves; and believing that it was the stimulating properties of the remedy, and not any imaginary power it possessed in rendering the blood more fluid, that made ammonia useful, I determined to try the effects of champagne, which I did in the next case of scarlatina that fell into my hand, which was at the commencement of 1859; the result was most satisfactory. Since that time I have

attended a very large number of such cases, yet I have rarely given a dose of medicine of any kind during the last ten years. The moment I became satisfied that the case was one of scarlatina, I have administered the champagne regularly and freely. The more severe the febrile symptoms, being convinced that they resulted from an atonic rather than an opposite state, the more bold has been my administration of the stimulant, and these symptoms have always diminished in violence instead of being increased by the treatment. The rash has come out more freely; I have not had one solitary example of diseases of the ear, or of malignant sore throat; but one of unconsciousness, with a typhoid condition; and also but one solitary instance of nephritic dropsy. The last case only confirmed my views. The young child of a professional man was seized with the fever, but the attack was very much masked in its early stage. Three days elapsed before I could satisfy myself that the case was really one of scarlatina; and I believe that the loss of these three days, during which champagne was not administered, had much to do with a *slight* attack of dropsy with albuminuria, which followed in about three weeks. Of course I do not believe in universal remedies of any kind, but I am convinced that in the disease under consideration, the true plan of treatment is to save the patients from the stage of depression instead of trusting to our power of lifting them out of it at a later period. One of the latest cases which I attended illustrated the possibility of doing this in a remarkable manner. A fine boy, seven years of age, was attacked very smartly in March, 1869. Within forty-eight hours after I first saw him his lips had become dry and brown, his tongue being the same. Sordes gathered about his teeth, and his throat was rapidly assuming an alarming condition, both as regards its appearance and his inability to swallow; but during that interval the child had taken two full-sized bottles of the best champagne, and in the forty-eight subsequent hours he drank two more. The result was that all the typhoid symptoms disappeared as rapidly as they arose, and in the evening of the fourth day the child was sitting up in bed merrily rejoicing over a basinful of boiled milk. I have not the slightest doubt that any delay in the administration of the stimulant would, in this case, have been fatal. The suddenness with which the formidable symptoms sprang up, and the rapidity with which they progressed during the first two days, were most significant of a serious result. They passed away again even more rapidly than they arose.

Two points alone have I found requiring to be watched in connection with this plan. These are the possibility of sickness and of diarrhoea. Occasionally I have found it necessary to suspend the champagne for a few hours, falling back during the

interval upon old port wine, but such cases have been rare. The fact that a young child of seven or eight years of age can take an entire bottle of champagne within twenty-four hours, not only without intoxication but without any sign of excitement, is, in itself, significant of the atonic condition of the nervous system and of the necessity for upholding it *from the beginning*.

In addition to this plan of treatment I believe it difficult to exaggerate the importance of caution in the after treatment. After the first week I gradually diminish the stimulant, but rigorously enforce confinement to bed during the first three weeks, and to one room for three more. During the present spring I have seen the first case of a death occurring in spite of this treatment. It was that of a boy who had been delicate from infancy, and in whom some low muttering delirium set in on the second day; yet even here the power of the stimulant was exhibited. Early in the morning of the fourth day I was summoned to him, and found him apparently dying. For some hours previously the nurse had very improperly relaxed the administration of champagne; I immediately resumed it, and the consequent rally was most remarkable, again giving me hopes of a favourable result, but the boy sank early on the seventh day.—*Manchester Medical and Surgical Reports, October, 1870, p. 61.*

5.—SCARLET FEVER SUCCESSFULLY TREATED BY AMMONIA AND MILK.

By Dr. R. SWEETING, Stratford.

The object of this communication is to give to the profession the results of a number of cases treated by ammonia and milk. During the last four months I have had under my care upwards of sixty cases, the ages varying from eight months to forty years; the disease also varying from the mildest to the most malignant form. Out of these sixty cases there were only eight deaths; of these eight, the age of the eldest did not exceed five years, the majority were under three years, and in not one case did dropsy occur. My mode of treatment is as follows:—On my first seeing the patient I give a powder of five grains of calomel with ten grains of mercury-with-chalk at bed time, and a tablespoonful of castor oil on the following morning, thereby clearing the bowels at the onset; after which, the following mixture is administered: aromatic spirit of ammonia, three drachms; potassio-tartrate of soda, one drachm; compound tincture of lavender, one drachm; water to an ounce and a half: one teaspoonful every hour in cases from three to six

years of age; under three years the dose should be one-half; if above six years, the same recipe should be put to six ounces of water, and a tablespoonful given every two or three hours. When the patient is old enough to use a gargle, I find the following very successful: dilute sulphuric acid with compound tincture of lavender; to be used every four hours. To infants or very young children, who cannot use the gargle, I give the concentrated mixture, that it may stimulate the fauces—thus acting in the place of a gargle. From the commencement of the disease I give undiluted sweetened milk *ad libitum*, and find that the patients do well under this unstimulating diet, without losing flesh; and, what is encouraging, the little ones never refuse it, but will take it readily, while they refuse everything else.

I have noticed various methods of external treatment recommended in the public journals; and one given by Dr. Walter Fergus, in the *Lancet* of the 20th November, 1869, should in my opinion be avoided. He states as follows:—"The external treatment is of great importance. Rapid sponging with vinegar and water is called for if the patient does not sleep, or if there is much irritation of the skin. In cases of extreme development of the rash and burning skin, the cold douche rapidly given acts like a charm: the patient, placed in a sponging bath close to the bed, has four or five washhand basins of cold water poured in quick succession over him, is quickly rubbed dry and put to bed, when, if the treatment has done good, he drops off to sleep almost at once." Now, in every case that I have known, in which cold or warm sponging with water, or vinegar and water, has been resorted to, the patient has either died in the acute stage, or dropsy has supervened; and in one particular case I know of, the scarlet rash appeared at night, the child was ordered to be put in a warm bath at once, a few hours afterwards coma came on, and within sixty hours from the commencement of the attack the child died.

It is proper to remark that, after the first purgation with calomel and castor oil, I give a dose of castor oil every other night. It is astonishing to find how clogged and offensive the *fæces* become; it would seem as if the whole system was in a state of putrefaction. By expelling the morbid matter from the bowels at intervals of forty-eight hours a better tone is given to the circulation, and the milk then acts like a charm.

Should the cervical glands become swollen, a warm linseed poultice is used constantly until the swelling disappears. Should suppuration take place, I allow them to burst of themselves, and never lance them; if they are lanced, the discharge continues for a long time, exhausting the patient. During the

whole period of the disease I allow the hands and face *only* to be wiped with the end of a towel dipped in warm water.

I hold that it is the duty of each individual member of the profession to communicate the results of his practice in any branch of his calling, especially when such results tend to alleviate the ills of life, or in any way conduce to its preservation. We are often deterred from thus recording our experience by the fear of seeming egotistical; so that our literature often merges into magnificent writing, or into that sort of learned profundity that would dissect an oyster, but never humble itself to compare the results of different modes of treatment. Our studies are of use only as they make us more capable of relieving human suffering. *Homines medicinâ non eloquentiâ curantur.*—*Lancet*, June 11, 1870, p. 834.

6.—ON THE USE OF BROMIDE OF POTASSIUM AND AMMONIUM IN CASES OF CONTINUED FEVER, COMPLICATED WITH SLEEPLESSNESS, CONVULSIONS, AND OTHER CEREBRO-SPINAL SYMPTOMS.

By Dr. WILLIAM MOORE, King's Professor of the Practice of Medicine, Physician to Sir P. Dun's Hospital, Dublin.

During my recent period of duty at Sir P. Dun's Hospital twenty-one cases of continued fever came under my care, exclusive of measles, scarlatina, and acute rheumatism. Of these twenty-one cases, five were typhus, of which one proved fatal, the remaining sixteen were "enteric."

The first case I shall detail which was carefully reported by Mr. W. R. White, resident medical scholar, was that of Mr. C., admitted into the Pay-ward on the 4th of November, 1869, with well-marked typhus, about seven days in fever. He had great agitans and subsultus, especially when spoken to; the eyes were red and suffused; the pupils rather contracted; much delirium, he was ordered 8 ozs. of wine with beef tea.

On the 5th, he was in a very excited state not having slept the previous night, constantly trying to get out of bed.

On the 6th, he was very delirious, he had not slept, and he succeeded during the day in getting out of bed and running about the ward. His wine was increased to twelve ounces.

On the 7th, he was much in the same state, had no sleep, great agitans, and hyperæsthesia when spoken to and touched, continually trying to get out of bed. Ordered a drachm of the tincture of hyosciamus in an ounce of camphor mixture at bed-time.

On the 8th he did not seem to know anyone, and kept picking the bed clothes. The hyosciamus seemed to have quieted him

during the night, although he did not sleep. Ordered fifteen grains of bromide of potassium in an ounce of camphor mixture to be given him at nine p.m.

9th. The patient got several hours sleep during the night, and was conscious; the "floccitatio" has disappeared, the agitans and injected state of the eyes were much less; he did not remember a single incident since his admission. From this date his convalescence was established, and he left the hospital on the 20th November.

Case 2 (reported by Mr. Richard Lloyd, "Resident Medical Scholar,") was that of Mrs. Elizabeth C., aged 30, housekeeper, who was admitted into Sir P. Dun's Hospital on the 13th Nov., 1869, labouring under typhus fever of about eight days' duration. On the 14th she was maculated; dusky; eyes ferretty; teeth and lips covered with sordes; restless, sleepless, and delirious; with "floccitatio," and involuntary passing of fæces and urine, altogether, a most unpromising case. She was ordered a table-spoonful of whiskey in cold water, every hour, and beef-tea, the head to be sponged, and fifteen grains of the bromide of potassium in an ounce of camphor mixture, to be given at bed-time.

15th. Much in the same state, whiskey increased to a table-spoonful every half-hour, and the bromide of potassium to be given at bed-time.

16th. She had a quiet night, slept at intervals, continue the same treatment, bromide of potassium to be repeated at bed-time.

17th. Patient in a more favourable condition, had a quiet night, still passing under her, but in other respects improved. Same treatment with bromide of potassium.

18th. Patient slept several hours during the night. She was quite conscious from this date, the stimulants were diminished, and the bromide of potassium omitted, and she left the hospital after a tardy convalescence on the 19th December.

Case 3 (reported by Mr. White).—James T., aged 27, plumber, was admitted into Sir P. Dun's Hospital on the 16th of December last with well-marked typhus.

On the 17th, he was delirious, and had not slept; the eyes were injected, and the pupils rather contracted; his pulse was 120; temperature 103·9, respiration 30; he was ordered twelve ounces of wine with beef tea during the twenty-four hours, and to get twenty grains of the bromide of ammonium in an ounce of camphor mixture at bed-time.

On the 18th, he was not quite so restless, and had a quiet night. Same therapeutical treatment continued, twenty grains of the bromide of ammonium at bed-time. This draught was

repeated for four consecutive nights; the patient had a good recovery, and left the hospital on the 7th January.

Case 4.—This patient was admitted with all the symptoms of “enteric” fever. He had the rose-coloured spots; cæcal gurgling with tympany and diarrhœa; when comparatively late in the fever cerebro-spinal symptoms manifested themselves. The details of the case which were carefully watched and reported by Mr. Reuben Hervey, resident medical scholar in Sir P. Dun’s Hospital, are as follows:—

Peter O’C., aged 18, a compositor in the office of the *Evening Post*, was admitted into Sir P. Dun’s Hospital on the morning of the 14th December last. He had all the symptoms of “enteric” fever, and as far as we could gather, the day of his admission into hospital, was the eleventh of his fever. He had been a healthy young man with no tendency to epilepsy or nervous disease; his pupils were somewhat dilated; his eyes clear; he was tender over the ilio-cæcal region; slightly tympanitic, and had diarrhœa. Numerous rose spots were visible over the abdomen and chest. His temperature was 103·6. Pulse 116; respiration 20. He was inclined to sleep, and for several days seemed to be getting on favourably, and the diarrhœa ceased. Ordered eight ounces of wine.

On Saturday the 18th, the bowels were twice very freely moved, but he presented no other symptom calculated to cause any special anxiety. On Saturday night, about half-past ten o’clock, Mr. Hervey noticed the patient lying on his back, low down in the bed, with his arms folded over his chest; his breathing was rapid and irregular, a circumstance which Mr. Hervey had noticed during the afternoon, and had found no chest complication to account for. When spoken to he made no reply, nor did he stir, but when he turned on his side he spoke a few words and swallowed some whiskey in milk; a blister was applied to the nape of the neck. About three o’clock on Sunday morning he was unable to swallow, and his respiration was still more hurried, and there was a good deal of agitations and subsultus present, with nasal stertor, injected eyes, and contracted pupils. He moved his eyes with great rapidity, would swallow nothing, and lay with his head retracted. The head was shaved and a blister was applied over the vertex; he now seemed insensible to all appliances, his feet and hands were hot.

He remained in this anæsthetic state till ten a.m. on Sunday, when he opened his eyes, took a drink, and regained his consciousness so far as to speak to the nurse and some friends, still he had involuntary passing of fæces and urine. It was impossible to obtain a sample of urine for the purpose of examination.

The blister over the vertex was dressed with ung. hydrarg. To get twelve ounces of wine and four of whiskey.

About six p.m. on Sunday, he suddenly relapsed into the same unconscious state attended with opisthotonos. He now got twenty grains of the bromide of ammonium in a draught, which he tried to reject; he passed a better night, but on Monday morning he had a series of convulsive attacks which lasted over four hours, these were succeeded by diarrhoea and copious flow of urine, all of which were passed involuntarily. On Monday night the twenty grains of the bromide of ammonium were repeated, also on Tuesday night, during both of which days he had occasional intervals of consciousness. On Wednesday, owing to a return of the fit, he got twenty grains of the bromide at 11 a.m. and at 4 p.m. and that night he had some quiet sleep. On Thursday he again relapsed, and could not answer any questions, but was able to swallow; the bromide (twenty grains) was now given three times a day, and that night he had a little sleep. On Friday he made an effort to answer questions if very much pressed, but still passed under him. At this stage, with difficulty, a sample of his urine was obtained, its sp. gravity was 1021, and it contained no albumen. The bromide of ammonium was continued three times a-day. He slept the greater part of Friday night, on Saturday he could answer any questions he was asked; took greedily what was given to him, and ceased to pass under him. On Sunday the bromide of ammonium was discontinued, all cerebro-spinal symptoms disappeared, and he had a favourable and comparatively speedy convalescence.

The maximum temperature in this case was 103·7; maximum of pulse 120; of respiration 48.—*Medical Press and Circular*, May 4, 1870, p. 345.

7.—THE USE OF BROMIDE OF POTASSIUM IN AGUE.

Cases under the care of Dr. MOXON, at Guy's Hospital.

It is known that bromide of potassium was first introduced into medical practice, as a remedy for enlargement of the spleen, by Dr. Williams. Reference to the cases which are given in full in his *Practice of Medicine* does not, however, show any relation of the remedy to ague-poison more especially than other causes of enlarged spleen. It was as a spleen-remedy, and not as an ague-remedy, that it was found useful. During the last four months, trial has been made at Guy's Hospital, among the out-patients, of the use of bromide of potassium in ague. The results are such as to show that this drug possesses a very remarkable power over ague, and a power that promises to be of important use in many of the more obstinate cases. Dr.

Moxon has had several instances of its successful use; and two of these were in persons who had taken quinine for a length of time without benefit. The following is a short note of one of these cases.

J. P., aged 27, a joiner, had been laid up for two months with tertian ague. It presented this peculiarity, that at the onset it continued its course for a fortnight, and since that time had alternated weekly; so that he shivered every third day in one week, and was free from shivering the next, and so on—a week of ague following a week of rest. His spleen was three inches below the false ribs in the mammary line. He had the look of ague, but had not lost much flesh. He took quinine nearly from the first constantly, but did not get any better. He came to Guy's Hospital as an out-patient under Dr. Moxon on January 10th, and then commenced taking scruple doses of the bromide of potassium thrice daily. On the 17th, he said he had had no shaking the previous week, though it was the week when he ought to have shaken; but he had had some headache. The dose was increased to half a drachm three times a day. He never had a fit after taking the bromide; and on the 24th of January his spleen had gone up, so that it was only one inch below the ribs. He remained under treatment until February 28th. On presenting himself then, he said that he had had no more ague fits; he felt bodily stronger and better than when he first came, and his spleen was scarcely to be detected by the fingers. The so-called "bromism" had not been produced in him. His fauces and conjunctivæ were sensitive as those of other people.

The other patient had applied on the same day as this man, and had given a very similar account of herself; *i. e.*, ague for many weeks, and continual use of quinine without benefit. The bromide was prescribed; and, after attending once and reporting benefit, she ceased her attendance on the following week.

The following case shows still more strikingly the usefulness of the remedy:—

J. S., aged 19, a gardener, from Streatham, came under Dr. Rees's care with tertian ague on June 13, 1869. He stated that he had had paroxysms of ague every third day, between four and five in the afternoon, for the last two months; and had taken quinine during the whole of that time, but had derived no benefit or relief of any kind therefrom, and consequently sought relief at this institution. On admission, he had the general appearance of a healthy lad, but complained of tenderness in both hypochondriac regions. There was extended dulness over the liver, and also over the spleen. On the following day, he was ordered two grains of quinine in infusion of gentian three times a day. On the 14th he had another

paroxysm. On the 20th, the dulness over the liver and spleen was more extended; and on the 27th it was noted that no benefit had arisen from the quinine. He was accordingly ordered twenty grains of bromide of potassium in infusion of gentian three times a day. On June 30th, he was noted to have been free from attacks since the 27th, and felt better. On July 3rd, the splenic dulness was diminished, and he felt well. On July 7th, he was discharged well. During this patient's stay in hospital, he had taken eighty-four grains of quinine without benefit; but, after the first drachm of bromide of potassium, he pronounced himself materially relieved.

A considerable number of other more recent cases have been treated in the same way; and this has been the general result—that the bromide always checks the ague, so that for one or two weeks the patients have no seizures; that in some of the cases the cure is permanent, even while the patients still continue to reside in the place where they took the ague; but that in many cases, when the patient is still in the ague-district, the ague-fits return after one or two weeks of free interval.

Thus it appears that the bromide of potassium is a remedy well worth a trial in cases of ague that do not yield to quinine, or in cases where the patient has left the place where he was seized with the poison; but it is not pretended that, for the general cure of ague, it would compete in advantages with quinine. Dr. Moxon took the suggestion of its use from Mr. Walter Buchanan, a student of Guy's Hospital, to whom all credit for the notion is due. It certainly appears that a new and important service of the bromide is here shown; and it is interesting to compare this result with the power which iodine and iodide of potassium have shown in curing ague, as reported in Virchow's Archiv, xlix.—*Brit. Med. Journal*, June 11, 1870, p. 602.

8.—THE INFLUENCE OF MILK IN THE PROPAGATION OF CONTAGIOUS DISEASES.

By LAWSON TAIT, Esq., Birmingham.

In the month of April last I was engaged with my friend Mr. M. E. Naylor, veterinary surgeon, in examining the conditions attending the spread of the foot-and-mouth disease in the West Riding; and, amongst other stations of suffering, we visited the farm attached to the West Riding Lunatic Asylum, under the superintendence of my distinguished friend Dr. Crichton Browne. I had a long conversation with the intelligent farm-bailiff, Mr. Turner; and amongst other experiences, I tasted the diseased milk. I found that this had a peculiarly disagreeable smoky taste, and at first I rashly set this down as due to

the disease of the cows. I found, however, that this smoky taint was by no means confined to the milk yielded by the affected animals; and Dr. Browne told me that he had sometimes occasion to send away milk and cream from his table, which was unfit to use on account of this smoky taste. A little examination further showed us that this flavouring was due to the recent asphalting which had been done in and near the milk-house. It at once flashed across my mind that, if milk acquired this tarry flavour from the absorption of the exhalations of asphalting it was just possible that it might also acquire other things which were not so innocuous; and I at once set going a series of experiments which have led me to the belief that milk is an extremely dangerous agent for the spread of contagion. I need not say that I did not try any experiments, as they were all personal, with contagious matter; but by enclosing fresh milk under bell-jars with tar, turpentine, assafoetida, fæces, urine, etc., I found that in most instances the milk became impregnated with the smell, and sometimes with that intensely disagreeable sensation which we know as the "taste like the smell" of the substances employed. The degree to which this was acquired seemed not so much to be in proportion to the amount employed either of milk or of infectant substance, but to the amount and quality of the cream which rose to the surface of the milk; the oleaginous molecules seeming to act as the menstruum of contagion. This is not unlikely, when we remember that the best solvent for nearly all odoriferous principles is oil. Clinically, this question will be most difficult and dangerous to work out. For one, I shall not attempt it. But, if we bethink ourselves of any instances of disease which might in certain instances be communicated by milk, typhoid fever stands out with fearful probability. Enteric fever is nowhere more common nor more fatal than in country farm-houses, where means for the removal of the dejections are not sufficiently well adapted for security, and much too convenient for safety. Endemics of typhoid fever break out in towns, limited sometimes to a house or particular family, in such way as to defy any explanation by deficiencies of drainage or water-supply. I am certain that I have seen cases that might bear the explanation of milk-poisoning, although I have not had the opportunity of working out the facts—facts which, even if worked out, might be capable of other explanations. The question is a difficult one, but worthy of consideration; and the letter in the *Times* of Thursday last, describing the possibility of the spread of the contagion of scarlet fever by means of milk, strengthens the view I am inclined to hold—that such communication is rather common.—*British Medical Journal*, Sept. 24, p. 344.

9.—THE TREATMENT OF BLEEDING CANCER BY CHLORIDE OF ZINC PASTE.

By C. F. MAUNDER, Esq., Surgeon to the London Hospital.

[The treatment so successfully adopted in the following case appears to be most suitable when the tumour cannot be taken clean away by the knife, nor by any other means, yet in which the discharge from an open sore, is, with the inevitable pain, gradually wearing out the patient's strength.]

Mrs. —, 40 years of age, extremely stout, but of good general health, first noticed a lump under the left breast about two years ago, when removal was advised by Mr. Samuel. She was then lost sight of by him until Christmas, 1869, when the disease had progressed, and become deeply adherent. In February, 1870, ulceration and bleeding had set in, and continued to increase up to the time of my visiting her. In the middle of April I saw her in consultation with Mr. Samuel, of Mansell Street. With the exception of a somewhat care-worn expression of countenance, Mrs. — had the appearance of a person in perfect health. On examination, she was the subject of an open sore about three inches in diameter, having thickened indurated everted edges, and a firm, solid, thick base, about an inch thick. The greater part of the area of this sore and induration was below and to the inner side of the left breast, but encroached upon, running up under and into it, as it were, for a short way. On removing the dressing, blood flowed freely, and the odour was very offensive. On each occasion of dressing the wound bled very freely, causing great alarm to the patient and her friends, who were sometimes unable to arrest the hemorrhage without Mr. Samuel's aid. Removal by the knife was impossible, by reason of the relative position and fixed state of the growth, and I determined to endeavour to prevent periodical hemorrhages by destroying the surface of the ulcer, and keep it in abeyance with chloride of zinc paste.

The first dressing consisted in the application of a piece of zinc paste to the surface of the sore below the breast, and on the forcible introduction of one or two "points" of the same material, hardened, into the indurated portion of the adjacent mammary gland. Then came cotton-wool to absorb any possible discharge; a piece of antiseptic carbolic plaster, a compress of lint, and a bandage to retain these in position. The last and fourth application by me of the paste was made on April 27th, two days having been allowed to elapse between each. At each dressing a substance composed of paste and cancer-tissue was picked away, and the depth of the diseased growth had been lessened. After the second and third application the patient experienced a good deal of pain. It was now agreed to

wait the result of treatment, and to repeat the use of the chloride only in case of recurrent hemorrhage.

I have not seen the case since, but to-day (June 17) the husband of Mrs. — informed me that Mr. Samuel has not made any further use of the paste, nor has hemorrhage, which was previously constant, recurred, after the lapse even of so long a time as more than seven weeks. Neither has the disease progressed, but the swelling about the sore is smaller, a large slough having come away.

To-day (June 19th) Mr. Samuel tells me that “Mrs. — has greatly improved in health, being able to sleep well, eat well, and taking moderate exercise. The sore is now granulating healthily, discharging normal pus free from smell, and contracting rapidly—indeed, there is every prospect of ultimate closure of the wound, and that soon. There has been no recurrent hemorrhage whatever; whereas formerly bleeding occurred at odd times, necessitating his being called up at night sometimes to arrest it. The good effect of the treatment upon the patient’s mental and bodily health can scarcely be exaggerated, and he is both astonished and gratified by the result.”

This method of treatment is of course not novel, but its applicability to certain cases has scarcely received the attention which it merits; and I am therefore the more anxious to draw the attention of the Profession to it because two seniors had just previously seen the case, and had not suggested a remedy. This is not the only instance in which I have used ehloride of zine for a similar purpose.

Had the antiseptic carbolic plaster anything to do with the good result of the treatment? does it tend to check cancer-cell growth? It has been used up to within the last week.—*Med. Times and Gazette*, July 16, 1870, p. 61.

10.—SUNSTROKE AND ITS THEORY.

By Dr. ELY VAN DE WARKER, Syracuse, New York.

[Dr. Van de Warker, after an interesting notice of the literature of the subject, relates four typical cases from those which came under his notice during the American war. The symptoms may be grouped in three stages. The first attended by loss of appetite, headache, and general feeling of languor. There is often among the earlier symptoms, exhaustion of nervous energy, swollen face, and faltering of the tongue. The seizure, or second stage, comes on suddenly with coma, irregular and convulsive breathing from engorged lungs, sometimes general convulsions. The skin is generally dry and hot, the face

flushed, and the temperature raised to over 104° Fahr. The third stage which consists of collapse, generally closes the scene.]

The physician is very seldom called to attend the patient in the first stage. In 60 cases in New York Hospital, 44 were insensible at time of admission, 16 were either stupid or sensible. The pupils were dilated in 30, contracted in 19, and natural in 11. The respiration was hurried in 44. Pulse uniformly quick, varying from 100 to 160 or more per minute. Convulsions were present in 24 (Swift). Dr. Repper reports 20 cases, 3 of which resulted in insanity, a very rare termination. In 33 fatal cases the pupil was contracted in 20, moderately dilated in 7, markedly so in 6. No cases are reported of recovery where the pupils were contracted. Mr. Longman notices a frequent desire to micturate as a very constant symptom, and places great emphasis upon it, believing, should it prove to be an invariable symptom, that it may become valuable to the surgeon as an indication of approaching danger. In India, where insolation attains a more defined expression, the premonitory phenomena assume more prominence. They generally are weariness, debility, and prostration, nausea, vertigo, and incontinence of urine. On the march in the ravines of northern Bundelcund, described by Dr. Barclay, no one was attacked by insolation who had not previously exhibited the symptoms. These symptoms are to insolation what the premonitory diarrhoea is to cholera. Barclay says, when the disease is fully expressed the pupil is always contracted—to the size of a pin often—the face invariably pale; the skin harsh, *dry*, and burning to the touch, *far beyond the doctor's experience in any other disease*. Frothy mucus, clear or of a brownish colour, was in most instances ejected from the mouth and nostrils before death. Face often ghastly from the beginning of the attack. Dr. Simpson, of her Majesty's Seventy-first Regiment, gives a very graphic review of the symptoms of sunstroke occurring in that command. An intensely hot, dry skin, *lasting even after death*, in those who died within twelve or sixteen hours, and a feeling of weight just below the ensiform cartilage. Involuntary weeping or laughter. A tumultuous action of the heart, and beating of the carotids. "Loud moaning during the stage of coma was almost invariably present"—a symptom distinguishing it from the coma of apoplexy. There was a great desire to sleep, which passed rapidly into a state of insensibility. In many instances attempts at deglutition brought on convulsion of an epileptic character, and in others genuine epileptic convulsions, lasting from five to fifteen minutes, also mania and hysteria.—(*Braithwaite*, vol. xl., p. 301.)

What renders morbid insolation almost Protean in its extensive list of symptoms is the fact that the heat devotes its morbid influence to one organ or set of organs, to the exclusion of other viscera. In some cases we have a predominance of lung-symptoms; in others the brain is the organ affected, constituting a true heat-apoplexy; while in others the spinal cord and great nerve-centres are the principal seat of morbid action.

Theory of Sunstroke.—A careful study of the phenomena of insolation must lead the reader to but one opinion, that insolation is the expression of the presence of a morbid degree of heat in the organism. It is now my purpose to account for the presence and retention of this morbid heat. An opinion held by many of our army surgeons was, that it results from a drainage of the serum of the blood by excessive perspiration. Common causes must to a certain extent produce common pathological effects: but in this case we see the phenomena of insolation clearly isolated from that attending the colliquative sudation of phthisis, or the vast fluid evacuations of cholera; cases in which the fluid evacuations are obtained at the direct expense of the serum of the blood. There must be some other morbid force at work. Yet we briefly recapitulate the predisposing causes: Any depressing influence; continued fatigue; bad air or food; intemperate habits; febrile condition or plethora; highly electrical or malarious condition of the air, and a thermometric condition of the atmosphere of from 95° to 120° F. During our march from Savannah to Hawkinsville, Ga., the men did not suffer from insolation until the fourth day of the march, when the entire command was prostrated from exertion and the excessive heat. In Dr. Barclay's experience the men suffered a gradual deterioration of health. There are, therefore, two conditions which are indispensable prerequisites to an attack: 1. General depression of the vital forces from whatever cause; and, 2. A temperature of from 95° to 120°. One of the first effects of these conditions is an arrest or impairment of function. This is pre-eminently the case of the cutaneous secretion. Dr. Simpson observed: "Every man seized with sunstroke, and who could answer questions, informed me that he had not perspired for a greater or less extent of time—sometimes not for days—previous to being attacked, and that he enjoyed good health so long as he perspired, but that on the perspiration being checked he felt dull and listless, and unable to take much exertion without making a great effort."

This suppression of the cutaneous secretion was always accompanied by a rise in the temperature of the body; often as high as 112° (Dowler), and, according to Dr. Levick, 104° to 111°. This is a constant precursor of an attack, so much so,

that the absence of perspiration is regarded by Indian surgeons as a warning of danger (Morehead). By a study of the more pronounced form of insolation we see two constant conditions: 1. An arrest of cutaneous function; and, 2. A rise in the temperature of the body unparalleled in any other form of disease. The first manifestation of the diseased condition is the arrest of the function of the skin; the second condition is in the increase of temperature. These conditions stand in the relation of cause and effect, as I will shortly prove. We see in other forms of diseased action the same effects produced. In intermittent, in typhoid, or malarial fever, or in acute pneumonia, suppression of the perspiration leads to a rise in the thermal condition of the body, and a restoration of the function of the skin by either the action of remedies or by a spontaneous amendment of the disease, is followed by a corresponding depression of temperature. In intermittent fever this phenomenon is constant, independent of any remedial measures, the result of a law of Nature, that the febrile stage of the attack closes spontaneously in profuse sudation and a consequent abatement of systemic heat. In insolation the arrest of the perspiration is but another in the series of cause and effect. A man with the action of all the vital functions unimpaired is not liable to insolation. The many causes enumerated before, all-tend to lessen or suppress function; this is not only seen in the arrested cutaneous secretions, but in the constipation, and in some cases the suppression of urine, and the engorged condition of the liver, spleen, and other important glands. There is, therefore, a complete chain of morbid acts: 1. The preliminary state of exhaustion and depression; 2. The resulting impairment of function; 3. The retention in the system of a morbid degree of heat, resulting in 4. Insolation.

This constitutes the morbid acts of insolation in the order of their occurrence. In this view of the disease I am considering the case in its typical form. From the multitude of symptoms that characterize sunstroke, these leading phenomena can always be clearly isolated.

The integrity of the cutaneous function is essential to the maintenance of the equilibrium of the thermal condition of the body. The perspiration is one of the principal avenues of escape for the surplus heat generated by the operations of organic life. While this is true of the body when in a quiescent state, it becomes a cardinal truth when the body is in a state of exertion and exposed to an elevated temperature. The healthy man, when exposed to these conditions, at once perspires, and the temperature of the system is preserved at a normal standard. If this means of compensation between the systemic heat and that of the surrounding air is impaired, heat must accumulate

in the system in reciprocal proportion. To use a familiar illustration, the evaporation of perspiration from the surface of the body lowers its temperature in the same manner as the evaporation of water from the surface of heated iron.

When the body is exposed to intense solar heat, the perspiration is the direct antagonist of the sun's rays. When we reflect upon the amount of heat necessary to evaporate one ounce of water, it is easy to see how the arrest of this function may lead to serious or fatal lesion of the vital fluids or nerve-centres. An ounce of water passing from the fluid to the vaporous state receives as much heat as would raise its temperature to 990° Fahr.; or, the quantity of heat required to convert a quantity of water into vapour is five and a half times as much as will raise it from the freezing to the boiling point. The evaporation from the surface of the body of one ounce of perspiration would transmit from the system to the surrounding air all the heat required to accomplish its evaporation. On the contrary, the arrest of this secretion would lead to the retention in the system of the heat otherwise expended in the conversion of it from the fluid to the vaporous state. The other excretory functions being impaired, it would obviously require but a short exposure to an elevated temperature to lead to an accumulation of a morbid degree of heat. This is not an immediate effect; it is progressive. The impairment of function goes on with the impairment of strength. The exhausting march, or the stoking at the furnace, or labouring in the field, is still continued, and, before the victim is aware of it, possibly, the skin has ceased entirely to act. There are now but few avenues of escape for the systemic heat resulting from muscular action, from the oxidation of tissue, or from the hæmal oxidation of normal alcohol present in the lungs, and still less escape from the alcohol the man too often takes to relieve the exhaustion from which he is suffering. In addition to this, from the sun's rays the body is continually absorbing heat, until such a degree of heat is present in the system, that disorganization of the blood results, or the nerve-centres are so oppressed by its presence that insolation results. I therefore conclude that insolation is the expression of the presence of a morbid degree of heat in the organism dependent mainly on the arrest of the cutaneous function.

Pathology.—There are no uniform lesions revealed by *post-mortem* examinations in insolation. There is generally some one organ more prominently affected, as if the morbid cause had expended upon it all its violence. This want of uniformity depends in a great measure upon temperament, condition of the system, length of exposure or exhaustion, and the stage at which death intervened. Dr. Simpson concludes, from his *post-mortem* observations of the disease, that death, in a great

measure, results from the entire or partial suspension of the depurative functions. Martin attributes the negative character of the necrotomic results to the rapidity with which the disease runs its course. In those cases occurring in the shade or under cover, in which the disease is more lingering in its character, the dura mater is remarkably congested, with more or less engorged condition of the lungs. In those cases occurring in the full force of the sun, there is found marked pulmonary apoplexy, and the brain is found to have escaped with no or but little engorgement. In those cases of instantaneous death, with pale face and clear conjunctiva, no organic lesion is observed; the death being like that from lightning—a sudden invasion of the centres of organic life, and leaving no trace. Congestion of the lungs in all other cases is rarely wanting. The appearance of the blood, lungs, and brain, indicates that there is extreme venalization of the blood, resulting in narcotism of the brain and heart. Favourable cases occurring on the march present the appearance of cerebral syncope proceeding to apoplexy, and terminating in febrile reaction (Martin). According to Dr. Boislinière, moderate pressure on the thorax after death resulted in the expression of bloody froth from the mouth and nostrils, and on section it was found in the lung-tissue. So characteristic was this appearance, that *post-mortem* examinations were dispensed with, and the coroner's jury directed to bring in a verdict of death from insolation. Dr. Boislinière found the brain usually normal. In a few cases there was slight congestion of the superior cerebral veins and of the sinuses. This condition Dr. Boislinière accounts for by the difficulty of the return of the blood through the engorged venous trunks extending to the right side of the heart, and this setting back of the blood in the veins of the brain and sinuses causes an exudation of serum often found. In his cases the presence of serum under the membranes was quite remarkable. In Mr. Longmore's cases, occurring in an unventilated air, the appearances after death were those usually resulting from death by asphyxia. In some portions the lungs presented the appearance of interstitial apoplexy. The engorgement of the brain was not a constant lesion, and when present was less marked, seeming to be subordinate to the impairment of the functions of the respiration and circulation. The substance of the brain on section often presented numerous blood puncta. Morehead says the blood is always fluid, but some observers have found clots in the right side of the heart, extending throughout the venous trunks. According to Dr. Levick, a constant pathological condition was an altered state of blood, which is liquid after death, and under the microscope showed shrivelled and crenated corpuscles. According to Flint, the vessels of the pia mater are congested as in congestive apo-

plexus, but rarely the vessels within the cranium. Dr. Pepper found the heart in four cases flaccid, and structure softened. The late Inspector-General Murray, of Madras, supposed that the predominance of cerebral lesions in some cases was accounted for by the exposure of the bare head to the direct rays of the sun, but other *post-mortem* observations have not verified this opinion. The *débris* of the body, consequent upon the serious wear of the material of life, seems to overload the vital fluid: the skin and kidneys having ceased their function, the lungs are selected to accomplish this depurative act; they, owing to the excessive attenuation of the air, are unable to effect this, and the blood, propelled by its *vis a tergo*, fills the lungs to engorgement. Mr. Hill, in many *post mortems*, found the lungs engorged, and even extravasation in the pulmonary tissue. Mr. Russel, of Her Majesty's Seventy-third Regiment, in three cases found the lungs congested even to blackness, and so densely loaded that complete obstruction must have taken place. Drs. Mortimer and Green, at different stations in India, have recorded similar conditions of the lungs (Aitken). Mr. Hill has often observed an exsanguined condition of the mucous membrane of the small intestines, being pale and blanched, resembling the pathological condition of cholera. Fibrinous coagula in the heart is mentioned by M. Campet, forming a common pathological condition with yellow fever, or the malignant remittents of India.

Treatment and Prophylaxis.—A study of the symptoms will furnish ample data for treatment. In view of the exalted thermal condition of the body, means to combat that condition are evidently the leading curative measures. The cold douche is a most powerful means. The patient may be stripped, and cold water poured from a height of three or four feet. Ice to the head was first used by Dr. Darrach, in 1857. He details four cases treated in this way, three of which recovered. Although the douche and ice applications are valuable remedies, still we must bear in mind that depression of the vital forces forms a serious element in the disease. Care must be exercised that the cold applications are timely and only carried to that extent indicated by the condition of the patient, and the manner in which they are borne. In many cases we first see the patient in a state of collapse; it would be obviously improper in this case to use a general cold douche. Cold applied to the head, and, if the patient can swallow, teaspoonful doses of brandy and chloroform, or any other diffusible stimulant, are indicated. Relaxation of the pupils is the first symptom of amendment usually following the douche. In case of relapsing insensibility, resort must be had again to the douche; the hair should be cut short, and a blister applied to

the neck or to the vertex. Sinapisms to the feet, calves of the legs, and chest, are in order when the relapsing insensibility persists. In cases in which the temperature of the body is lowered by the refrigerant measures, but consciousness or delirium persists, the cold applications should be at once discontinued, and stimulants and stimulating enemata, with sinapisms to chest and extremities, be resorted to. As soon as may be, after the exhibition of the douche, a purgative enemata should be given, followed after its operation by an enema of turpentine. In cases of cerebral congestion, Longmore and Barclay recommend a few leeches to the temples. In cases of great oppression of breathing, and where the bronchial tubes are overloaded with mucus, the patient should be turned frequently over upon his face and side. Observers in this country and in India are united in their opinion against venesection of any kind, as blood-letting always appears to hasten a fatal termination. In the convulsive form of the disease, the douche occasions great distress, and ought not to be employed. In these cases Dr. Barclay found the inhalation of chloroform very useful; the convulsive efforts ceasing after a few inspirations, but in several cases its employment seemed to hasten the fatal issue. But, as convulsions are ominous of that result of the case, the remedy may be free from blame. The free use of the bromide of potassium may be useful. In cases of tardy return of the function of the skin, the patient may be placed in a warm bath, rendered stimulating by mustard or capsicum.

Dr. Beatson, of the Indian service, gives a very judicious plan of ready treatment for military surgeons. He says: "Unfasten, as quickly as possible, the man's dress and accoutrements, to expose the neck and chest; get him under the shade of a bush; raise his head a little, and commence the affusion of cold water from a sheep-skin bag, continuing the affusion at intervals over the head, chest, and epigastrium, until consciousness and the power of swallowing return. When this takes place, the affusion may be stopped and a stimulant mixture given occasionally in small doses. Dr. Hewlett reports a case successfully treated by blood-letting, and the administration of codine and bromide of potassium in fifteen grain doses.

In speaking of the prevention of heat apoplexy, Sir J. R. Martin says, "The spirit-ration and the abuse of ardent spirits constitute the chief accessories." Sir Charles Napier, when serving in Sindh, says of an attack of insolation he suffered there: "I had hardly written the above sentence, ten days ago, when I was tumbled over by the heat with apoplexy; forty-three others were struck, all Europeans, and all died within three hours except myself! I do not drink! That is the secret. The sun had no ally in liquor among my brains." Martin gives

it as his opinion that, by temperance in diet, with as little exposure to the sun as may be compatible with the service, the protection of tents, head-dress, and body-clothing being suitable, European troops will march well under the hottest sun of India.

Many of the French army surgeons in Algeria, and especially M. Scoutetten, insist upon the necessity of wearing a covering for the neck as an efficient means of protection against solar heat, the neck-covering being as important as the head-dress. In my own army experience, I always observed that soldiers uniformed in the ridiculous Zouave dress were very liable to heat-exhaustion and sunstroke. In this uniform there is no covering for the neck, and the red fez and turban are the worst possible covering for the head. Troops in the field ought never to be allowed to wear it. Newly arrived troops in a hot climate ought always to be an object of special care to the officers. The protective helmet of Dr. Julius Jeffreys was of inestimable value to the British in India.

Dr. William Nolan, who had charge of one thousand men employed in building the Abyssinian railway from Zoulla to Kamaylec, under as hot a tropical sun as can be found in the world, says the men should wear a head-covering which will admit of being soaked in water, or a wet handkerchief under the ordinary head-covering; at the same time he permits the use of stimulants in moderation. The only head-dress worn by the natives of Abyssinia is a lump of butter, which by melting runs down the neck and shoulders, and prevents their drying in the intense heat.

The protective influence of temperance was effectually demonstrated by the British troops serving at the siege of Delhi. The officers marched many days in June, July, and August, and served in the trenches exposed to a temperature of 130° , and preserved their health to a wonderful extent.

In regard to the prevention of this disease in civil life, but little additional may be said. It is common among labourers to wear dark-coloured flannel or cotton shirts. They ought either to be white or worn with a white cotton shirt over them. Dr. McDowall, assistant-surgeon of the Bombay Army, speaking of severe solar exposure in 1865, says: "We all suffered in exact proportion to the depth of shade of our flannel. Now, in the jungle in the hottest weather, and in the sun, I have often ridden, and do ride still, both for experiment and comfort, in my shirt sleeves; but that shirt is white. Any other colour requires a proportional thickness." The neck and chest should be covered. A light straw or palm-leaf hat with a high crown is the most suitable head-covering for labourers in the sun, worn with fresh leaves or wet handkerchief in the crown. The

working-man should always attend carefully to his diet, and never work exposed to a high temperature while suffering from the calls of hunger. The overseers of public works ought to impress upon their men the importance of total abstinence as a preventive of sunstroke. The violent reaction following overstimulation is attended with most serious effects when the subject is exposed to a high temperature. Men should be instructed that, when they experience a sense of fulness in the head and of tightness across the chest, with a total or partial suppression of the perspiration, they ought immediately to stop work and protect themselves from the sun's rays until the functions of the body are restored. Persons in infirm health or convalescent ought to take extra precautions when exposed to severe heat. It should always be borne in mind that only sound and temperate men are able to bear severe exertion in a high temperature with impunity.—*New York Med. Journal*, Aug. 1870, p. 30.

11.—WHAT IS CHOLERA COLLAPSE?

By Dr. T. FARQUHAR, Surgeon-Major, Bengal Medical Service.

[On visiting a cholera patient, two things at once strike the attention, and instinctively as it were produce a certain plan of treatment, until experience proves the futility of that treatment, and leads to further investigation of the disease. The urgency of the abdominal symptoms leads to the use of opium, and the exhaustion of the system to the use of stimulants.]

What, let us ask ourselves, are the constant symptoms in cholera, for by attending to them we are most likely to understand the disease; and if we succeed in convincing ourselves as to what tissues are more directly affected we will be less likely to waste our strength in trying remedies at random?

They are not, let us premise, abdominal as far as vomiting and purging are concerned. They are not paralytic, they are not cramps, or a dozen other accessory symptoms that might readily be enumerated as frequent in cholera.

What then are constant symptoms? There is pallor or lividity of the skin. There is rapid shrinking of the cellular tissue, with pinched face, and eyeballs shrunk into the sockets. There is death-like chilliness of the body; the breath becomes cold, the tongue is cold, the breathing is weak. Heart sounds are feeble, the pulse begins to grow thready and weak, finally disappearing at the wrist and in the larger vessels. Secretions of bile and urine cease. Blood, when drawn, is black and tar-like. Mind is clear almost to the last. Muscular force, though lessened, is yet considerable in relation to the fatal symptoms present, and the near approach of death, which closes the scene.

After death there is blood in the pulmonary vessels and right side of the heart. The left side of the heart and arteries are empty. There is fulness of the vessels of the intestines, and fluid, I believe, or watery stools in them.

If the patient is to recover, which he often does, from the most fatal-like symptoms, the heat of the body gradually returns, the pulse in the larger arteries is felt, the pinched face and sunken appearance of the eyes are less noticeable, the body seems to fill out, the colour of the skin returns, the tongue and breath become warm, and, last of all, bile appears in the liquid motions, and the secretion of urine is re-established. These are the symptoms of what we call collapse, a state of the system frequently seen from other causes, as irritant poisons, putrid meat, etc. In ague, again, from malarious poisoning we now and then come across cases which, in the cold stage, have such similar appearances that they can with difficulty be said not to be cholera.

These symptoms, which, as in the cold stage of ague, last for a limited time, are more or less indicative of the spasmodic contraction and subsequent dilatation of the pulmonic and systemic capillaries. While in their contracted state we see the interruption to the flow of blood and its non-aëration producing all the symptoms of collapse, and on their dilatation the evidence of what we call reaction. In this belief we are established by the similar physiological effects observed to result from galvanic irritation of the sympathetic on the one hand, and division of the nerve on the other.

This spasm of the vessels is, then, what we often alone see in a case of true cholera. Presumably, this is what we have principally to deal with in this disease. If we were able to overcome this contraction and allow the circulation to go on through the pulmonary and systemic capillaries, we would keep the patient alive till the poison passed off by some of the secreting organs, or exhausted itself in the system. We have analogous instances to build this hope on in cases of poisoning by opium and snake-bite. If by the bastinado, or walking the patient about, you keep him awake for a given time, he recovers. If he is neglected, and allowed to sleep, he passes rapidly into a state of coma, from which there is no waking.

It would be certainly better if we could neutralise the poison, as we do in case of acids, etc., or purge the mass out of the body as we do of rotten food in the stomach. It would be well, also, if we could act on it, as we nowadays do on ague by large doses of quinine, or by ipecacuan in dysentery. Let us not lose heart in this matter, but hope that an antidote may some day be found for cholera, and may not the experience of the last two drugs lead us to believe that even now we may have the

specific by us, when we remember for how many years these medicines were in our possession, but only lately were their value and doses discovered in India.

In speaking of treatment, it is far easier to say what to avoid than what to do. Dr. Murray's collection of Indian experience teaches one great lesson—viz., that we have culpably neglected, up to the present time, to institute a regular system of inter-communication on the subject of the treatment of cholera. Each individual or small group of men has followed different plans, based on individual theories, many ignorantly trying methods of cure that have notoriously failed in the hands of their predecessors. What we want now is, an organised system of positive information, based on carefully observed statistics, and some central authority through whom information on particular modes of treatment can be obtained. One thing most of us in India have learnt, and that is to avoid large doses of opium and stimulants in collapse. The opium has seldom if ever, at the time, the sedative effect we desire to see from it in ordinary doses, and is apt to be repeated and accumulate in the bowels. So that when we look for recovery we see death, with painful evidence that opium is the determining cause of the event. Stimulants, if not at once rejected, are followed by marked exacerbatons of the severer symptoms, especially that tossing restlessness so markedly connected with the want of aëration of the blood; and in the stage of reaction, if it occurs, the mischief caused by them seems to be as great as if brandy was poured into the system of a man in the hot stage of intermittent fever, or suffering from an attack of heat apoplexy.

We each and all have our favourite remedies in which we believe. There are few, however, of these that we can enumerate with great confidence. A gentle aperient guarded by carminatives and a few drops of laudanum seems to act like a charm, however, in relieving the many who suffer from disordered bowels and the malaise of epidemic cholera. Indeed, in most epidemics, the numbers attacked with these milder forms of disease and who recover are so numerous, that it may be said few of the population in the affected locality escape. In the enumeration of deaths to sick, cholera may thus be said to be less fatal than several other more common but less dreaded diseases. Large mustard poultices, covering the whole of the abdomen and loins, are invaluable, probably by exciting the capillary circulation, and relieving the abdominal engorgement and distress. Temporary benefit is seen to follow hot baths, warm saline injections, whatever, indeed, appears to relax the capillary arteries. Would that this their action would continue. Shampooing, with stimulant embrocations, give great relief; but to further enumerate such measures here would be useless.

One point not sufficiently noticed is the existence of choleraic diarrhoea observable sometimes ahead of the first pronounced case of cholera, and it may be certainly concluded that the disease is plentifully about in this mitigated form, while the severer cases are occurring. This diarrhoea is a fruitful means of propagating contagion, and in the unobserved wanderings from place to place of the sufferers, we have a ready explanation of the apparently independent outbreaks of true cholera cases.

In India what are called sporadic cases are so little liable to spread, that they do not demand any special sanitary measures.

When, however, as in the late terrible loss of life at Peshawur, cholera is on the move, the cases occurring are then known to be part of an expected epidemic attack, and the sooner all precautionary measures are taken the better. It is so far satisfactory to know that instant sanitary advice was given to the authorities there, and if delay occurred in carrying out the removal of the troops, executive or political difficulties were to blame.—*Med. Times and Gazette*, July 30, 1870, p. 117.

DISEASES OF THE NERVOUS SYSTEM.

12.—ON THE CLINICAL USES AND FORMS OF ELECTRICITY.

By Dr. J. RUSSELL REYNOLDS, F.R.S., Professor of the Principles and Practice of Medicine in University College.

With regard to *treatment* by electricity I have a few general remarks to make. You can sometimes actually and immediately cure a patient. There are cases in which the only symptom that may be presented to you—I do not say the whole morbid condition, but the only symptom—is loss of voice. Sometimes one single application of electricity will remove it completely, and in that instance you do apparently cure the patient. There are other diseases which you cannot be said to cure, but which you may relieve by electricity. By its application you may, in many instances, again and again, relieve pain; you may, in like manner, relieve spasm; or you may slowly diminish, and even ultimately remove, paralysis. In these cases you assist, by electricity, the processes which lead to the removal of the pain, paralysis, or spasm: you put the patient, by electrical appliances, into a better position to improve, or be cured by the agencies of food, medicines, rest, and time. Lastly, there is a group of cases in which, though you cannot cure, or even relieve, the symptoms, you may yet arrest the progress of disease.

Sometimes, for example, in a child with so-called "essential paralysis," you may prevent deformity, though you cannot cure the paralysis. In certain cases of lead-poisoning, muscular atrophy, &c., although you cannot recal the muscular substance, you may prevent the atrophy from increasing.

I think it is necessary for me to say a few words as briefly as possible, about the several forms of electricity which are now in common clinical use. You constantly hear of "faradisation," "electrification," "galvanism," and so on; of "battery-current," "continuous current," and the like: and it is probable that some of you may not have perfectly clear ideas as to the meaning of these terms, or, at any rate, ideas which are precisely the same as mine, and I should like us to have a common starting-point, in a clear comprehension of the meaning of the words we use.

(a) Many years ago it was the therapeutic fashion to put the legs of patients into buckets of torpedoes, or electric eels; but this practice has become obsolete, and there are now only three forms of electrical appliance in common clinical use. One is that of the old-fashioned "electrical machine," either a cylinder or plate of glass, which, by friction, produces a certain amount of electrical disturbance, one of the results of which you collect on an insulated piece of brass called a "prime conductor." This is the oldest mode of applying electricity which is now in force in our hospitals. In the present day it is sometimes called "static" electricity; and in speaking of the use of static electricity, what is meant is that the person is charged, like that "prime conductor," with electricity of that particular kind. It has also been called "frictional" electricity, from the mode of its production; and also "Franklinic" electricity, or "Franklinism," in memory of the individual who—I will not say discovered it, but who—made out more about it than any one else at the time that he worked at the subject.

1. There are three modes in which that electricity is applied. One is simply to make the patient, as it were, a part of the prime conductor, and charge him full of electricity. You insulate your patient by placing him upon a glass-legged stool, taking care that he is not in contact with any conducting substance; then you connect him by a brass chain, by his own hand, or by any other mode you like, with the prime conductor; you set the machine in action, and fill him full of electricity, doing nothing more. That is the simplest mode of applying static electricity. In certain diseases it is curious what this will do, without putting the patient to the least discomfort. Probably the only thing he will be conscious of is that his hair seems to be "standing on end;" this is neither painful nor even uncomfortable, but it is wonderful how much that simple

“charging” a patient will effect in some forms of disease. I have known it absolutely remove, in a few seconds, a “tic” that had lasted for days. Pain in the sciatic nerve, many odd and disagreeable sensations, unpleasant flutterings about the heart, depending on weak innervation, and tremor of the limbs, may all be removed by simply “charging” the patient.

2. Another mode of using this franklinic electricity is to apply a “spark” to a particular part. You may have a movable, insulated brass knob in connection with a prime conductor, and you direct it to the larynx, or some other part, and let the spark go into the skin. Or you may put the patient on a glass-legged stool, and charge him or her in the way I have described, and take a spark out of the larynx or the limb with your knuckle or with a rounded knob. In some cases of aphonia, where the aphonia depends on a special condition, you may insulate the patient and charge him with electricity without the slightest benefit; but take a spark out of the larynx, or put a spark in—whether positive or negative it matters not—and that particular condition of aphonia may be cured directly. This I have known to occur when much more painful processes of electrification had been previously tried, and without effect.

3. A third mode of using franklinic electricity is that of sending the shock from a charged “Leyden phial” through the part that you wish to affect. This has occasionally produced curative results when other modes have failed; and it is in obstinate nervous aphonia that its influence has been the most distinctly seen. But, short of being hanged, I do not imagine that anything could be much more unpleasant.

(b) The next form is what has been called Galvanism. It is the form of which one hears so much, in the present day, under the name of the “continuous current,” or “battery current,” or, as it has been sometimes called, with a Hibernian misuse of words, the “interrupted continuous current.” By all these terms is meant that form of electricity which is developed by chemical decomposition. The particular form of battery does not matter, so far as the quality of the electricity is concerned. Wherever you have chemical decomposition in progress, there also is some electrical change going on; and the only object a medical electrician has, in choosing any particular form of battery, is to catch the electricity as best he may. This form of electricity is characterised by the following features:—It is of low “intensity,” so far as regards its action upon nerve and muscle, but it is in considerable “quantity,” and it produces “chemical” results, and results on temperature, “thermic” results, that are not approximated by the franklinic electricity.

I am not now going to describe to you the batteries, of which there are numberless kinds. The choice among them is guided

chiefly by considerations of cheapness, portability, the ease with which the machine can be kept continuously in order, the bulk of the battery, and the readiness with which its strength of action can be regulated. What you want is a current that shall play evenly, and at a measurable strength, for a certain length of time. It is convenient to have a battery that is portable, and it is a great point to have one that does not require everlastingly looking after. The battery in our electrical room in this hospital (Elliott's) is not portable, but the majority of our patients are: it will act very steadily for three or four months; it is tolerably cheap; it can be very readily put in working order by a person who does not need a great amount of electrical skill; and you can easily regulate the strength of the current you employ.

1. There are two modes in which this kind of electricity, or galvanism, is used. In one of them the current is "continuous," in the other it is not. A really *continuous* current may be passed through the body, or part of the body; and this is accomplished by introducing the whole or a portion of the human body into the circle of the battery, and then letting the current play through it. This will do the following things:—it will relieve spasm of certain kinds; it will relieve pain of certain kinds, and this sometimes in a few seconds, and the effect is as obvious and distinct as is that following the administration of an emetic. A person may have a particular kind of headache; you pass a continuous current, as it appears, through his head, and sometimes in a few seconds the pain is gone. It will also remove some forms of tremor and of spasm.

I want you to bear in mind certain points respecting the effects of the continuous current upon the limbs, according to the direction in which it is passed through those limbs. Supposing I have the positive end of the battery connected with a person's left hand, and the negative end connected with his right, the current passing from the positive to the negative pole goes up the person's left arm to the trunk of the body, and down the right arm to the machine again. The current passing up the arm has been called the "inverse," and that coming down the arm has been called the "direct." In the arm in which the current is passing upwards the "irritability" of the muscle and nerve is gradually increased; in the other arm, in which the current is passing downwards, the irritability is gradually diminished. You may test this fact by now and then breaking and remaking the continuous current; and you will find that in the two arms two different degrees of irritability exist, according to the direction in which the current had been passing, whether up or down. One arm will act more,

the other less readily than in health. The difference thus produced between them is sometimes highly marked.

It may occur to you to ask, "If that be the case, which current should I use to relieve pain and spasm, the direct or the inverse?" All I have to say is, that so far as I have seen, it does not make the smallest difference. Theoretically it should make a very great difference, but practically it makes none. I have seen pain or spasm relieved as well by the current in one direction as in the other, and this whether the spasm has been clonic or tonic, or whether there has been merely tremor.

The continuous current, when weak, produces little or no pain. The patient feels nothing, or next to nothing. If it be strong, he feels a tingling or burning at the points of contact, and a sensation of tightness and tension in the part, between the points of contact, that is very disagreeable, or, indeed, intolerable.

2. Another mode of using the battery current is by *interrupting* it—making it not continuous. This may be done in various ways. You may take the two sponges attached by wires to the two ends of the battery, place one sponge on the upper part of the man's leg, and interrupt the current by occasionally dabbing the other sponge on the leg at a more or less distant point. By that means you "make" and "break" the current. Or you may have a simple piece of apparatus attached to the battery—a cogged wheel, with alternating conducting and non-conducting materials; which wheel can be rotated, and so interrupt the current, while the sponges are maintained in place. Or you may use a little vibrating wire, which makes and breaks contact rapidly, as in one of Pulvermacher's interruptors. In thus applying the battery current you will notice this further fact—namely, that the "direct" application produces more obvious effects upon the muscles (*i. e.*, induces a more marked contraction) than does the "inverse" or "indirect." You will find, for example, that an interrupted battery current—say of ten cells,—which when sent *down* the arm produces distinct contraction of the muscles, may elicit no contraction, or very much less contraction, when it is sent *up* the arm in the opposite direction. It is important to bear this in mind when thus using galvanism for the purposes of either diagnosis or treatment, as I shall hereafter show you.

(c) The third form of electricity is "faradisation" or "faradism." It has also been called "induced" electricity, "magneto-electric," "voltao-magnetic," "voltao-dynamic." When you hear used any one of these words, you will understand by them that particular kind of electricity of which Faraday was the great exponent. It is electricity of very high

tension, and resembles more closely franklinic electricity than it does the galvanic current. The chemical action of faradisation is almost *nil*; the direct effect on temperature is almost *nil*; it causes no burning feeling, no sensation of heat, like that which is communicated by the galvanic current; but, under ordinary circumstances, it produces marked contraction of the muscles, and a powerful action on the nerves of both motion and sensation. It is an "induced" current, and is of momentary existence only; but these momentary currents may be repeated slowly or repeated quickly. It exists only at the moment of making or breaking the galvanic current, or at the moment of making or unmaking a magnetic condition in a piece of metal; but it may be made or broken so rapidly that you may pass very many currents in a second of time in both directions. Remember, lastly, that, though it is of momentary duration, it is of very high tension.

There are two terms used commonly about it, and which you may see on batteries of various kinds—"primary" and "secondary." It is for clinical purposes an almost useless distinction. The difference between the two has been said by some to be this—that the primary will have a more distinct action upon one set of nerves, and the secondary upon another. But the most marked physiological difference that can be made out between them is that the secondary is of greater intensity than the primary, and will sometimes proceed more deeply into the parts you wish to affect. It is an unhappy use of the word "primary," for the current so named is not a primary current in the sense of being a battery current; it is essentially an induced current. The other is an induction from an induction, and is "secondarily" induced, and the clinical difference between them is mainly one of intensity. If, then, you apply the terms "primary" and "secondary" to faradisation currents, remember that you should mean by *each* of them "induced."—*Lancet*, March 5, 1870, p. 331.

13.—ON ELECTRICITY IN MEDICAL TREATMENT.

By Dr. J. RUSSELL REYNOLDS, F.R.S., Professor of the Principles and Practice of Medicine in University College.

[There are three elements to consider when speaking of the modification of electric sensibility—namely, the skin, the muscles, and the nerve-trunks.]

1. In health, the application of electricity to the skin is accompanied by sensation varying, in kind and degree, in relation to the form and the force of the agent employed. Franklinic electricity, when used in the form of sparks, produces a

stinging sensation in the skin, which is painful to some people, but not altogether unpleasant to others. The continuous galvanic current produces two sensations: one, a feeling of burning, which is intense in proportion to the force that is employed, and which is especially felt at the point of contact of the positive pole; the other, a sense of tension and thrill between the poles. Faradisation gives rise to a feeling of stinging or burning, in proportion to the intensity of the induction, the rapidity of the interruption, and the dryness of the conductors.

In disease, the electric reactions of the skin may be much changed. The patient may exhibit an increase, a diminution, or an entire absence of sensibility.

(a) Increase of sensitiveness is found in many simply "nervous" people, whose sensations are all, more or less, exaggerated. In them, too, you may observe much of the hysterical character, and sometimes it is obvious that the increase of sensibility is due to a central—i.e., to a mental and moral—state, rather than to any peripheral change. But occasionally you find that the skin of one limb is more sensitive than that of its fellow, and usually that this increase is associated with augmented sensibility of the muscles to electric action. The diagnostic value of this change is identical with that of increased electric contractility, so far as the nature of the lesion is concerned, but it may differ from it in regard of the precise locality of change.

(b) Diminution of cutaneous sensibility to electricity is met with when there is the condition of "shock" which accompanies recent and suddenly induced paralysis; and at the same time there is, commonly, loss of tactile sense and of the power of appreciating cold and heat. It is also found in some cases of hysteria, apart from any paralysis or other change of motility; and it may exist, as a chronic symptom, in some very rare cases of central disease.

2. When the muscles are put into action by electricity the healthy individual feels their contraction. If the force employed be of low tension, and only slowly interrupted, the sensation is not unpleasant; but if the current be of high tension, or be very rapidly made and broken, the feeling in the muscles amounts to pain, and, indeed, to very severe pain, of cramp-like character. In health the amount of sensation is in direct proportion to the force of the contraction; but in disease this relation does not always persist; and, moreover, there are certain states of the nervous system in which both contraction and sensation are together morbidly exaggerated or depressed.

(a) Increased electro-muscular sensibility sometimes exists alone. I have found it in the trunk, or in all the limbs, or in only one of them, apart from any general or local increase of

contraetility. Patients sometimes feel, and feel painfully, an amount of museular contraction which they would seareely reecognise in health; and this painfulness of museular movement may be either general or local. It is usually dependent on change in the central nervous system, is aecompanied by increased eutaneous sensibility, often by neuralgia, and by other modifications of sensation—pseudæsthesia, or dysæsthesia—which are sometimes erroneously termed hyperæsthesia.

The electro-muscular sensibility may be augmented, *pari passu* with the inerease of contraetility. In such eircumstances the muscles act more energetieally, and the patient feels that action more acutely than he should do in health. Sometimes this condition is general, and then the only eomparison that ean be made is between the patient and the average of other men. But when the inerease is local, as, indeed it often is, the limbs of one side may be contrasted with those on the other. The diagnostic value of such inerease is the same in kind as that which I have already described to you when speaking of augmented contraetility.

(b) The sensibility of the museles is usually diminished when their contraetility is reduced; and this diminution is eommonly in direct proportion to that reduction—as, for example, in lead-paralysis. But sometimes there is other than this parallel deviation of the two functions from their healthy standard. We meet with eases in which the contraetility persists, but in which the sensibility is diminished or extinguished. The muscles act well, but the patient does not feel their action. This peeuliar relationship is observed in some eases of hysterical paralysis, but I have also found it in individuals who had exhibited none of the ordinary features of hysteria. On the other hand, it has been found that in rare eases of lead-poisoning the sensibility has remained intact when the contraetility has been diminished. When contraetility, as well as museular and eutaneous sensibility, are all diminished in a limb or in one-half of the body, the condition is one either of “shoek” or of extensive erebro-spinal lesion; the time during which the symptoms have lasted, and the mode of their onset, will enable you to diagnostieate between them.

3. The nerve trunks appear to be so involved in certain electrie applications that sundry sensations arise from their irritation. When the poles of a galvanie battery are applied to the skin in elose proximity to one another the nerve-trunks may eescape; but when they are widely separated some nerve-trunks may be involved in the circuit; and then, with the continuous current, there is, in proportion to its strength, a feeling of extreme diseomfort—of straining and burning—between the poles, and some sensation of tingling, numbness, or “pins-and-

needles" beyond their points of contact. If, under such circumstances, the current be made and broken, there is a painful feeling of shock at or about the joints which may be traversed. A similarly painful affection of the nerve-trunks may be observed when the conductors of faradisation are widely separated. But the most painful of all modes of electrification is that by the Leyden phial, the sudden jar which is given by this mode of appliance being such as few can bring their minds to bear. A strong shock from a large Leyden phial or from a battery of phials will sometimes completely paralyse nerves of both sensation and motion in the parts through which it has passed.

The application of electricity to the nerves of special sense produces sensations of special kind, such as flashes of light, a phosphoric odour, a saline and metallic taste, or a rumbling noise; and these sensations may be induced either directly or indirectly. Giddiness, faintness, or nausea may be also brought about by electricity; but the clinical uses of such applications have yet to be discovered,

In some cases of general torpor from cerebral disease or blood-poisoning, and in destructive disease of the spinal cord, and in these alone, do we find the diminution of electric sensibility in the nerve-trunks, when that function is appealed to in the manner that I have described.

Therapeutical uses of Electricity.—I told you in the first lecture that, by the aid of electricity, you might in some instances cure a case—*e. g.*, one of hysterical aphonia; that in other cases you might relieve the patient—of pain, spasm, and paralysis; and that in some other cases, although you could neither cure the disease nor actually diminish the symptoms, you might prevent their further progress—you might arrest the disease.

1. Remembering the objects that we have in view, let me recall to you for a moment what it is that electricity can do, in its several forms, in order that you may understand the better how to apply it to the various conditions of disease.

First, it may call into action, or it may increase the action, of a nerve or a muscle; and this is what you want it to do when nerve or muscle is in a state of inaction or under-action.

Secondly, electricity may reduce, or even annihilate, for a time, the action of a nerve or muscle; and this it is that you may sometimes want to accomplish when a nerve or muscle is over-active. You can, therefore, use it, on the one hand, to reduce action or to stop action, when this is excessive; or, on the other, to bring out the action of a dormant muscle or a dormant nerve. If you have paralysis, loss of sensation or loss of contractility in a muscle, you may, in many cases, so use electricity as to restore voluntary movement, to restore contractility, to restore sensation. If you have pain, over-action,

or spasm—whether tonic or clonic,—you may so use electricity as to diminish those conditions, and bring nerve and muscle to their normal states. The mode in which you use electricity will determine the effect that you produce.

(a) The under-action of a muscle or nerve shows itself in either paralysis—using that term in its widest and most general sense—or in anæsthesia; or in diminished sensation—“hyperæsthesia,” as it is sometimes called. It shows itself, also, in weakness of a limb; there need not be what we call “paralysis,” but the limb on one side is weaker than on the other, although it is still under the influence of the will: by a strong effort, the patient may do something with it—may, indeed, put all its muscles into play, but the movements are slowly produced, and are wanting in force. Still further, this condition of under-action shows itself in a relative softness of muscle, and a flabbiness of limb; although, if you take a tape and carefully measure it, you will find it of the same size as its fellow. You can feel a great difference, which you cannot always represent by figures; but often there is, as the expression of central disease, actual, obvious, and measurable wasting of muscles and of the other tissues of the limbs.

(b) The over-action, or perverted action, of a nerve or muscle shows itself by spasm, as contrasted with paralysis; by hyperæsthesia, as contrasted with anæsthesia; or by spontaneous pain, or something which is not spontaneous pain, or genuine hyperæsthesia, but which has been called “dysæsthesia”—viz., a painfulness of those sensations which are habitually unfelt when produced by ordinary impressions. For instance, when there is “intolerance of light,” it is not that the patient can see better than you or I; he cannot see nearly so well, but he suffers pain during the ordinary act of vision. Do not confound this with genuine hyperæsthesia. The latter is rare, the former comparatively common; but both may be sometimes relieved by electricity.

There are, further, two conditions of the muscles which are the opposites of those I mentioned just now—viz., first, hardness of a limb, where it does not amount to actual rigidity; and, secondly, actual rigidity, in which it is difficult to flex or extend the arm or leg. Further, there is tremulousness of a muscle; and, lastly, clonic spasm, showing itself in slight fibrillar twitching, or in catching movements of the limbs. These are all signs of an over-action that may sometimes be reduced by electricity.

As part of its effect upon muscular fibre, you must regard also the action of electricity upon the vessels. The effect on vessels is simply an extension into another region of that which I have already told you occurs in voluntary muscular tissue. There are

certain contractile fibres in the walls of the vessels, and you can influence them by electricity in the same way as you can other muscular fibres. If the vessels are dilated, as they very often are, in paralysed limbs, you find that the skin has a dusky, bluish-red tint, and that the limb is cold. Look at the hands of a semi-paralysed patient; you find the nails bluish-red, the extremities cold, and the capillary vessels large. No part of the hand is actually white, all is dusky pink. Here electricity is useful; it contracts the dilated vessels, and induces a healthy state of the circulation in the limb, which no other means will produce so readily. You can do this, as I have seen again and again, without any electrification of the voluntary muscles. If you act on the muscles of the limb, and draw the hand first one way and then another, you gradually increase the circulation; but, without calling forth the action of any of these muscles, you can restore or much improve the circulation in the skin, by a simply superficial electrification.

It is possible that electricity might have some effect upon another condition of blood-supply, just the opposite to the last—viz., that in which the vessel is contracted by the spasm of its contractile fibre. I do not know that here electricity has been of any practical service; but it is possible that, under some circumstances, it might be of use. At the commencement of an epileptic seizure, there is often a curious pallor of the face, and to a condition analogous to this in the pia mater it is probable that the loss of consciousness is due. It is possible that if one could catch a patient going off into a fit one might stop or check the paroxysm. In those persons who are subject to sudden pallors coming over the face, it is possible that by a due administration of electricity something might be done. I know of no reliable clinical facts about the electric treatment of this state of spasm; but in the other condition, in which you get engorged vessels from loss of contractility of the fibre, electricity has been very useful.

2. And now, what are the modes of using electricity for therapeutical purposes? Over-activity of a muscle, or nerve, or vessel, may be reduced by the application of the continuous galvanic current, direct in its course through the limb, passing, that is to say, downwards and not upwards. And remember, that this continuous current should not be so strong as to cause pain; it should be applied so as not to irritate the skin, and it should be applied in the course of the nerve, from above downwards.

Another form of electricity—faradisation—may also be employed to reduce over-activity. If you find, for example, a man suffering from torticollis—spasmodic wry-neck,—the sterno-cleido-mastoid and other muscles of one side acting most violently, and turning the head over to the opposite shoulder,—

you may stop that by passing through the sterno-cleido-mastoid muscle a galvanic current, or by applying weak faradisation, rapidly interrupted. The interruptions have to be very rapid, for if they are not so the application only increases the muscular action. The interruption in a rotatory magneto-electric machine is scarcely rapid enough, and is often very irregular; one of Stöhrer's batteries may be used. Remember, then, that the over-action of a muscle may be reduced by the application of faradisation, as well as by the continuous current; but that the faradisation must be weak, and rapidly interrupted. Another way by which you may reduce the over-action of a muscle is by faradising the antagonist muscle. Supposing the flexors of the arm are contracted, as in some cases of "late rigidity," and you find it difficult to get the fingers open,—the best mode of overcoming that condition is to apply faradisation, not to the muscles affected, but to the other muscles, the extensors, so as to antagonise them. Again, in the case of torticollis, where a man's head goes jolting over to one side, you can reduce the over-action by putting the antagonistic muscles into action by faradisation, and so pulling the head round into its proper position.

By the third form of electricity, also—static or franklinic electricity,—you may reduce over-action. For instance, in some forms of tonic spasm and painful affections of nerves you may reduce the over-action by charging the patient from a friction machine. Thus, those over-sensitive conditions of nerves which go by the name of neuralgia may many of them be at once removed by a charge of static electricity; and in the same manner the electric charge may be employed for the reduction of clonic spasm, or of that tremulous condition which resembles or passes into the state of paralysis agitans.

When either a nerve or a muscle exhibits diminished activity, you may often recall its functions to their proper standard by the use of electricity; and for this purpose either of the three forms of application may be employed. Franklinic electricity is distinctly useful in some cases where faradisation may have failed; but the interrupted galvanic current, and faradisation, are those which are most commonly applied.

In passing from these generalities to details of electric treatment, I will first speak of cerebral and then of spinal lesions.

3. First, let me direct your attention to those cerebral diseases which cause paralysis; and, at the outset, request you to be cautious. If, under any circumstances, paralysis, induced by cerebral disease, occurs suddenly, you should not use electricity at all—at any rate as a therapeutic agent—until some little time has elapsed. If you want to examine the limb, now

and then, for the purpose of diagnosis or prognosis, you may use it very cautiously with a low power—*e.g.*, a Cruikshank's battery, or some other form of galvanism. It is better to avoid faradisation altogether, for you may set up mischief, or, if you do not, set it up, some mischief may occur, and you may get the credit, or discredit of having caused it. Remember that the discredit may be entirely due to you for having used electricity indiscriminately. When there is any sudden paralysis, from any cause—whether hemorrhage into the brain, or some embolic blocking up of a vessel, or some sudden congestion,—it is very unwise to disturb the patient in any way; the best thing for him is to be left alone: so pray do not use electricity.

But when the onset of paralysis, due to cerebral lesion, is not sudden, there is one condition under which I should advise you to be very cautious how you use electricity, and that is when such paralysis is attended by pain in the head, weight of head, or giddiness of head. When these symptoms are present, it is well to postpone, at any rate for a time, electric treatment, and this although the symptoms have come on gradually. But supposing that the paralysis has come on slowly, and is unattended by any pain in the head, or by any of the other symptoms I have mentioned, you may use it, and that fearlessly; but, at the same time, you must be cautious in your mode of applying it, for, although you may be fearless about it, patients sometimes may not be so; and it is very desirable not to throw electricity into disrepute by so frightening a patient with your apparatus, or your mode of using it, that you get the consequences of fright set down to the bad effects of electricity. I have known this to occur in several instances. Young children, and even some who in other matters are not children, have sometimes been so frightened by the look of an electric machine, that serious mischief has been done by the fright—mischief which the electricity used could not possibly have produced, and which has sometimes been set up when the machine has not been used at all.

I pass on now to the consideration of those cases in which you may be recommended to use electricity therapeutically, and here must redirect your attention to their varying conditions.

(*a*) First let us consider that condition in which the contractility of the paralysed limb, when you first apply the electricity, is good (testing the contractility, of course, according to the mode I spoke of in the last lecture). On applying the current you find a fair amount of readiness in the response of the muscles. The patient feels the electricity, and you can see the muscles act. It need not move as strongly as the

healthy limb; but it moves, and you can see that it does. There may, or there may not, be any rigidity of muscles under these circumstances; but, in either case, you do little or no good by electricity. You may diminish the rigidity, you may improve the condition of the muscle, it may become firmer, the limb may become a little warmer, the colour may be more natural, that dusky blue tint that you so often find may be removed; but so far as the paralysis is concerned you may go on electrifying the patient day after day for a twelvemonth, and at the end of that time find him as much paralysed as he was at the beginning. That is my experience, and it is so with regard to each form of electricity. It is true also whether the paralysis of the limb be complete or incomplete. In direct proportion to the amount of contractility present is the uselessness of electricity. If the contractility be perfect, although the paralysis to the will be absolute, you can do nothing. If the contractility be retained, and be only very slightly diminished, you will very slightly improve the condition of the limb, and very slightly improve its relationship to the will.

(b) When the contractility is much diminished, there is much good that you may do, and you will be able to do it by working upon this plan. Use electricity—in such a form as you will select on the principle I shall mention in a moment—till you bring the contractility of the limb up to the normal standard, and, when you have done so, stop. You will usually find that the paralysis is diminished, and in some cases that it is cured. Let me remind you that it is the contractility, and not the power, of the muscle which is to be your guide, and assure you that to continue electric applications when the contractility is normal is to waste your own time, disappoint your patient's hopes, and bring electricity into disrepute.

There are two principal modes in which you may recall the lost contractility—viz., the application of the battery current, and the application of faradisation; either of these will be of service, and you may be guided in your choice between them by considerations of convenience. But supposing that you use the battery current, it must be interrupted. The continuous current for this purpose is of little or no avail.

Supposing that you want to apply galvanism to the arm or the leg in an ordinary case of hemiplegia, where you find the irritability less than in health. The best way to apply the electricity is to take big sponges attached to handles; not little sponges, such as are supplied with some machines, the size of the tip of the little finger, but good-sized sponges, as large as three fingers, a good inch in diameter. The handles should be of such a shape that you can take two of them in one hand, which for certain purposes is very convenient. Supposing it to

be the arm that you wish to apply it to, take one sponge well wetted, and put it on the shoulder, over part of the deltoid muscle, with the left hand, and take the other in your right, also well wetted, and stroke it down the arm over the lower part of the deltoid, then down the back over the triceps muscle, and then over the biceps in front, still keeping your left hand upon the deltoid. You need not spend much time over this; a few brushings down, occupying a few seconds, are enough for the arm muscles. For the forearm, bring the upper sponge down to the hollow in front of the elbow, and then give a separate stroke to the muscles here and there over the forearm. In the early days of a case of paralysis of the upper extremity depending on cerebral causes, I should not advise you to waste time, as you would be doing, in devoting much attention to the small muscles of the hand. You may simply take a sponge and bring it down the fingers. In the lower limb you may in the same manner take one sponge and place it on the gluteal region, and with the other work down the limb. What you are doing is this: you are constantly making and breaking the battery-current through the limb by moving the sponge slowly downwards. If you were to leave it in one spot it would be a constantly continuous current through the limb. By moving it you at the same time bring the current through every point of the muscles, so as to embrace each, from one end to the other, in an interrupted battery-current; and that is what you want to do to waken up its sensitiveness and contractility.

Respecting the use of electricity in this form, you will sometimes see statements made about the use of the inverse current in one case, the direct in another. I have never seen the slightest difference between the two, in their therapeutical effect, upon paralysis; and I have compared them again and again. If the current act continuously, the physiological effect on the nerve does differ in the two cases, the current downwards diminishing the irritability, the current upwards increasing it; but the therapeutical effects of the direct and inverse currents, applied as I have described, do not differ. In speaking of this, let me remind you of another fact which I alluded to in the first lecture—viz., that the current in passing down a limb acts more strongly than it does in passing up it. Supposing we had a Cruikshank's battery here of five cells, and that five cells was the minimum power that would induce contraction in a limb when the current was passing down the limb; you will find that the current from the five cells, if sent up the limb, will not produce contraction. So you must remember this fact in relation to the strength of the current.

So much, then, for the mode of application of the battery-

current: a large sponge, well wetted, with salt and water, the upper sponge kept pretty steady, the other one moved slowly down the limb along the course of the muscles so as to embrace different portions of muscles in the current, and using a stronger or a milder current according to the direction in which you send the electricity. But whichever form you use, please remember that you are to use such a force as is not painful; and you are to use such a force as will produce contraction. So just stop between the two extremes; do not use so weak a force that it is doing nothing, or so strong a force as shall be doing harm. The best guide for you, until you have had some experience of the individual upon whom you are going to apply it, is to try it on your own hand first; place it on your own hand, and use such a power as shall just to your own consciousness feebly move the muscle. You find sometimes that you are more sensitive than your patient, sometimes that he is more sensitive than you; but do not use any strength that hurts you. Whatever hurts a muscle, so far as the sensation of the patient is concerned, positively hurts the patient. Electricity should never hurt people if you want to cure or relieve paralysis. Use such a power, then, as shall be distinctly, but not painfully, felt. I think that too great importance can scarcely be attached to this. I have known electricity so applied to a patient's limb that he or she has almost fainted, and the electricity has done no good. Of course not. The idea of applying electricity to a paralysed limb so as to put the muscle into a state of cramp! That is the most mischievous thing you can do. Instead of waking up a natural action you put it into the most hurtful form of action.

Further, do not prolong the application until the muscle or the patient is tired. If you wear the muscle out, you do it as much harm as when you pain it. A few seconds devoted to each muscle are quite enough, and you may repeat this every day, or you may repeat it every other day, according to the sensitiveness of the patient. It is very much better to repeat it even twice a day, where arrangements for so doing can be conveniently made, than to continue it for a number of minutes at a time, and so distress or weary the limb. If you find that the application of this or of any form of electricity is followed by weariness in the limb, giddiness in the head, pain in the head, a feeling of faintness or of sickness, a nondescript sense of discomfort about the epigastrium, do not go on with electricity at all; cease altogether for a time.

If you are about to use faradisation, there are two or three points to be observed. You are not to tire the patient, not to pain the patient; therefore your application must be brief, and your current of moderate tension. You are to apply faradisa-

tion with well-moistened sponges, or buttons covered with wet chamois leather; because, otherwise, you may irritate the skin, but produce no further action. You are to apply the current to the muscles; but there is a difference in the mode of application of the faradic and the galvanic current. With the galvanic current you may place, as I said, one sponge on the shoulder and the other on the palm of the hand. Do not do that with faradisation, but keep the two poles near together. It is never worth while, and never advisable, to separate them widely. It is a good rule, in ninety-nine cases out of a hundred, to hold both in one hand. There is a double reason for this: one is, that you cannot then get them very widely separated; the other is, that you have the remaining hand at liberty. If you separate the two poles of a faradic apparatus widely, you are in great danger of giving the patient pain without doing him good, and upsetting the circulation in his head. If you take a tolerably strong faradic current and apply it to the palms of both hands, you will find very uncomfortable sensations in several parts, especially in the joints, wrists, and elbows; and, if you look, you will see very little muscular action at all. On the other hand, if you put the two poles near together, you will find that you can put the muscles of the limb into tolerably strong action with a comparatively weak current, and without causing any pain.

In the treatment of paralysis it is important for you to bear this in mind. Take both poles in one hand, and act upon all the muscles *seriatim*. Begin with the deltoid, first acting on the anterior set of fibres, then on the middle, then on the posterior; go down to the biceps and triceps, and then faradise the upper part of the forearm. In the first few applications you need not go beyond the arm and forearm; and afterwards, when these are in a better state, it is desirable to pay special attention to the muscles of the hand. In these you want handles with rounded ends, narrow stems, and metallic buttons covered with chamois leather. Make them wet, take the two in one of your hands, and pick out the different muscles of the patient's hand separately, and especially the little interosseous muscles. By groping about you will gain a certain amount of skill, so as to be able to pitch quickly on the particular muscles that you want to influence.

You will find that in both arm and leg there are particular points at which, if you apply your current, you will put the muscles into much stronger action than if you apply it elsewhere. Generally speaking, these points are where the nerves entering the muscles are most superficial; knowledge of anatomy will help you to find these points, but there is sufficient variation from these to make it necessary for you to examine the question

electrically, and to discover for yourself—even in special cases—the points through which the current may be sent with the greatest efficacy.

Sometimes you will find curious actions which you cannot very readily explain. For example, in faradising the peroneal muscles and the tibialis anticus, by applying one pole just behind the head of the fibula, you may, by placing the other pole above the knee, on either side, raise the heel from off the ground or the bed, by calling the psoas and iliacus muscles into action. I have seen the foot raised from eight to ten inches from the floor in this manner by a patient who could not lift the heel higher than two, or at the most three, inches by the extreme of voluntary effort.

Now, what do you do when you apply electricity in this way? You may restore, if it be lost, the nutrition of the muscles: you bring back their bulk. If the limb be cool, as it very often is, from the defective circulation, you may bring back the normal temperature. When the contractility has been defective, you bring that back to its normal state, and you will find then that you have very much improved the relationship of that limb to the will of the individual—that is, you *pro tanto* improve, or it may be entirely cure, the paralysis. The mode in which electricity produces this effect, so far as we can understand it, is this. A limb has been out of use for a certain time; its muscles and nerves have lost their nutrition, and their readiness to act; and the application of electricity has quickened the circulation and restored the diminished function of those tissues. We may, I think, go still further, and affirm that, in some instances, much more is accomplished than this merely peripheral effect. By stirring up the muscles and nerves of a limb you may to a certain extent act upon the other ends of those nerves—the ends that are in the back or head—and so you may improve, by careful usage, the nutrition of the spinal cord, or of the brain. There can, I think, be no doubt of the reality of this secondary result. It is obvious that faradisation of the extremity may seriously derange the circulation in the head; and it is no less clear that its application may be followed by results which a change in the conditions of the limb will not explain.

4. There is another point to which I will call your attention, and that is the condition of “rigidity” in a limb in cerebral paralysis. It is common enough in old cases, and sometimes is met with in those that are quite recent. In the latter cases I advise you not to use electricity, for you may do harm; in late rigidity, you may employ it without fear, and with considerable advantage. Here you may either remove the rigidity altogether, and also improve the contractility of the limb, or you may only diminish the rigidity, or

prevent its increase. It often happens that in a case of three or four months' duration you find the flexor muscles beginning to contract, so that the patient, waking up from sleep, in the night or in the morning, always finds his fingers bent, and the forearm prone, the flexure soon passing away again by a little rubbing or passive movement. After a time, although the hand may still be opened, it shows a constant tendency to close when it is left to itself, and at last the closure gradually becomes habitual. Now, the best way to counteract this tendency to closure is to faradise the antagonist muscles, the extensors of the fingers, and supinators of the forearm. Under such circumstances, you need not begin at the shoulder, because contraction of the kind I have been speaking of always begins at the distal end. You do not notice rigidity of the elbow till some time after you have noticed it at the wrist, nor do you observe rigidity of the wrist until after that of the fingers has been conspicuous. Sometimes in an early stage a few applications of electricity will cure the rigidity, and not only remove the tendency to cramp, but even bring back the proper contractility of the limb. But in more severe and protracted cases, in which there is some persistent, and often progressive, lesion of the head, you cannot cure the rigidity—*i.e.*, you cannot remove it altogether; but, even in these cases, you may sometimes do good. You may prevent it from getting as bad as it would do if left alone, and this is a very important thing to do; for, after a longer time, the rigidity becomes extreme, and the patient often refuses to submit to any treatment. Then it is found that the nails have dug into the hand, and that the pent-up perspiration has become fetid and disgusting. It is impossible to prevent the occurrence of sores in some cases, except by a timely electrification of the extensors. You may often call into action the extensors of a much weakened hand by applying a moderate faradisation with well-wetted sponges to the back of the forearm, or you may use galvanisation for the same purpose, interrupting the current in the manner I have described—*viz.*, by putting one sponge on the back of the forearm over the skin well wetted, and making and breaking the current with the other hand by moving the sponge upwards and downwards an inch or two below the upper pole. But faradisation is much better for this purpose than is the battery current, although the latter may be used to assist the former by applying it, in a continuous form, to the rigid and overacting muscles. For this purpose the current should be direct; one pole, well wetted, should be placed in the hollow of the elbow, and the other in the hand. A moderate current should be allowed to pass continuously from the upper to the lower for ten, fifteen, or twenty minutes, once or twice daily, according to the severity of the case. You faradise the extensors,

and galvanise the flexors of the hand and fingers; and you may, if the rigidity has extended higher, adopt a similar plan with regard to the muscles of the forearm or the arm.

5. Shaking movements sometimes occur in cerebral diseases, and may take the form of mere tremulousness, or of clonic spasm. In these cases relief may be given by two forms of electricity. It may be given by static electricity, charging the patient generally with positive electricity, and leaving it there, having previously placed him on a glass-legged stool. Or you may pass a continuous current, of low force, through the tremulous limb. In this case the best way of applying it is to place the patient's feet in a pan of salt-and-water, to put the pole from the negative end of the battery into the water, and then let the patient's hand be placed in a basin of salt-and-water, connected with the other pole. The current will then come up the leg and down the arm; and you will find that in many cases of tremor or clonic spasm accompanying paralytic conditions dependent on cerebral disease, this continuous current affords marked relief.

6. It will be well to consider here the electrical treatment of chorea. Years ago it was said that good results were obtained; but I must say that, so far as my own experience goes, electricity has done no good in this disease. There are a vast number of cases of acute chorea that will get well if you leave them alone; and almost any form of treatment will appear to prove efficacious if it be taken in conjunction with change from a crowded dwelling house to a well-ventilated hospital ward, to good food and quiet. I believe a great deal of the influence set down to electricity, ice-bags, iron, arsenic, quinine, and other medicine, has been imaginary; and that the really curative agents have been those that I have mentioned. The modes employed have been as various as the forms of electricity, and each one has lauded in the treatment of chorea that particular form to which he is addicted; but in my judgment, the less one says, in the present state of knowledge, about chorea and its treatment by electricity, the better will it be for therapeutical science.

7. I pass now to the consideration of some brain affections that are accompanied by alterations in sensibility. And, first, defective sensation, or anæsthesia. Anæsthesia of a limb, or of two limbs, is very rare, except in association with motor paralysis; and then, when it has occurred acutely, it usually exists only during the condition of shock. A patient, for instance, may become hemiplegic from an embolism, or from hemorrhage; and you will find that during the first few minutes, or sometimes few hours, or, in rarer cases, days, after the onset of the attack, there may be some loss of sensibility. It varies in

amount, but, during the condition of shock may be occasionally well marked. But after that condition of shock has passed away the sensibility commonly returns; and, so far as electricity is concerned, all I have to say is that, during that time, it would be very unwise to use any form of electricity at all.

In certain brain diseases of slow development you may find loss of sensibility; but these are, comparatively speaking, rare. You every now and then meet with some portion of skin defective in sensibility, from a tumour in the head or some other cause. But it is much more common for you to find some modified sensibility, such as "pins and needles," or painful impressions when the skin is touched. In those cases of acute cerebral disease, however, in which you do find persistent anæsthesia, or even only diminished sensibility, it is very rare for you to find that electricity does any good. It may do harm, and I should advise you not to use it unless the case were of such sort that you used it only for the purposes of diagnosis, and then only in such a form as you feel quite sure can do no mischief.

The examples of anæsthesia in which electricity is most useful are to be found in that curious class, or rather medley, of cases that goes sometimes by the name of "hysterical"; for they are met with in women, and are found together with symptoms of the kind commonly regarded as hysterical. Here you meet with marked anæsthesia of the skin in different parts of the body, almost always associated with a certain amount of awkwardness of movement, and sometimes associated with some very definite loss of power. The two often go together, for both the apparent power of movement and the actual power of combining movements are distinctly related to the integrity of guiding sensations derived from impressions made upon the skin. I have known cases of this kind which had lasted for months or years, in which movements of the body or of certain limbs were weak and clumsy, and in which the patients, finding it awkward to use their limbs, had ceased to do so, and in whom, from disuse, the muscular power had become defective, but in which electricity has proved wonderfully useful; for sometimes, after only a few applications, the sensibility and motility have been restored completely. Electricity should here be employed in such a manner as to produce a definite and distinct impression on the skin. Supposing there is anæsthesia of the skin of the leg, place one pole of a faradic apparatus in the patient's hand, attach to the other a dry metallic brush, and pass it over the surface of the skin. In that way you send in a number of little bright sparks, which you may see very plainly in the dark, and you sting the skin very briskly. Or you may take a charcoal conductor, or a metallic conductor, and move it up and

down on the surface of the skin. In the first few moments perhaps the patient does not feel it at all, but you now and then find the sensibility of the skin return with marvellous rapidity. Sometimes you will find it is a better plan to take two thoroughly wetted sponges, and a tolerably strong current to make the muscles act briskly. By so doing, in the course of a few minutes the skin will often recover its sensibility. I am not able to explain thoroughly why this should be, but I have seen it again and again. An analogous condition is that in which the skin retains its sensibility while the muscles have lost their contractility, and in which by stinging the skin you will sometimes restore the muscular contractility.

Whatever may be their explanation, these are facts, and they have a certain relation to each other. In facial paralysis, for instance, by stimulating the skin, either by electricity or by a blister, you may often bring back the muscular action very speedily. Or, where there is a loss of sensibility of the skin, the muscles acting tolerably well, you may, by putting them into forced action, restore the sensibility of the skin.—I think that most likely what one does under these circumstances is to stimulate that which is common to both muscle and skin—viz., vessels; and, further, that, in thus acting on the skin, we exert some influence on the nerve-trunks, and also on their central extremities.

You may accomplish the same end by franklinic electricity, by directing sparks from a prime conductor to the part affected, or by “charging” the patient, and taking sparks away from the surface by your knuckle or a brass ball. The effect of this application is that, in a little time, you redden the skin, and restore the sensibility. In extreme cases you may go still further, and apply a moderate charge from a Leyden phial. For instance, you may enclose a limb between the knob and the discharging rod, and let the shock go through it. This will sometimes bring back the sensibility when other means have failed.

8. There are two classes of spinal diseases to which I have already alluded, in one of which you have the true “spinal paralysis” of Dr. Marshall Hall; in the other of which you have “cerebral paralysis,” although depending on spinal disease. In the one the muscle derives nothing from the cord, because the latter is diseased or destroyed; in the other the muscle is still associated with the cord, though that cord may be cut off from the brain.

(a) First, let us take the case of the true spinal paralysis. What can you do there electrically? The damage done to the cord is to be measured by the loss of electric irritability, and this whatever may be the form of electricity that you

employ. If the electric irritability, in a case of this kind, be absolutely gone, and show no sign of reappearance after four or six applications, your prognosis is bad, and there is little or nothing to be gained by a persistence in the treatment.

Where you find a certain amount of contractility remaining there is a great deal to be done. You compare the limbs of your patient with the healthy limbs of someone of the same age and sex, same class of constitution and thickness of skin, and if you find contractility diminished somewhat, but not lost, there is much room for hope; and a great deal will depend upon what you do as to the upshot of the case in the future.

Take, as an instance, the case of "infantile paralysis" (so-called "essential paralysis" of children)—one of the best examples you can have. A child is a little feverish for twenty-four hours; you find it cannot sit up, cannot move its arms or legs for a few days. Then it begins to move one arm a little, and perhaps one leg; after a day or two more, perhaps both arms. If you do not notice it again for a week, you may find one limb completely paralysed and the other partially; the distribution varying. Post-mortem examination in such a case shows very often disease of the spinal cord itself, running along its whole length; a disease which, when left to itself, eventuates in the destruction of the tissue of the spinal cord; producing in the first instance perfect spinal paralysis, and in the last instance perfect spinal paralysis also, but the former curable, the latter perfectly incurable. In the early stage you find a certain amount of contractility left, but that is very defective. Here very much may be done by electricity. You find also this curious point, that the muscles respond much more readily to a slowly interrupted current than to a rapidly interrupted current. To faradisation you find them defective, and sometimes you cannot get them to act at all. If you interrupt the battery current very rapidly, they sometimes will not act to it; but if you interrupt it slowly, you find that they do. And what is very interesting about these cases, and to which I have already alluded, is this: that the muscles sometimes appear to act much more readily than those in health to a very low current of galvanisation.

To such cases the battery current, slowly interrupted, should be applied with a wet sponge, in the manner I described the other day. It should be applied every day for a few minutes, not troubling yourselves, at first, about particular groups of muscles, but just applying it to the whole limb. If it is the leg, put one of your sponges on the sacrum, just below the groin, or in the gluteal region, and move the other sponge slowly down the front of the thigh, and then the back of the thigh and leg. You often find, under such circumstances, that after

a day or two you have to use a stronger power to produce the effect that you produced at first; and you will find at the same time that the muscles respond more readily to faradisation. It is well then to change, and employ faradisation instead, using it with sponges well wetted, trying to pick out particularly certain sets of muscles which have a trick, as it were, of lagging behind the others. These are, especially, the extensors of the foot, the peronei, and the extensors of the fingers. Here, then, you may apply faradisation; and if the disease in the spinal cord be curable, I am sure you assist the process of cure. If the disease has existed for some time before the case is brought to you—and cases are often brought after three or four years' duration,—you will still find that occasionally you can do something. You may call into exercise the muscles of the limb; you can improve their nutrition and their strength; and you may do something towards effecting a change in the nutrition of the cord itself. Where, however, the disease has existed for some time, I have not seen that the repeated use of electricity has done much good, unless the improvement has been rapid at the commencement of treatment. You may see some enlargement of muscles, but there the improvement ends. When you find that, after four or six applications, there is no sign of electric contractility either by the induced or the battery current, it is useless to go on. I have managed every now and then to have cases treated for many months, with the forlorn hope that at some period or another there might be a ghost of contractility returning, but I must say it has been utterly unsuccessful.

(b) Let me now direct your attention to cases of paralysis, dependent upon spinal disease, in which there is not any true "spinal paralysis"; for the muscles still retain their connexion with a healthy portion of the medulla, although, owing to disease at a higher level of that medulla, they are completely paralysed to the will. In these cases electricity can accomplish but very little, and yet that very little may be of considerable service. Every now and then a certain group of muscles especially suffers; the sphincters of the bladder and rectum are very prone to be deranged. Sometimes the expulsive power is affected, sometimes the sphincter. It occasionally happens that, although you cannot in the smallest degree affect the limbs of the patient, you may give the patient a little more power over the sphincters. Probably the nutrition has failed, and the condition is something like that which I have already described. You may bring back power enough to make the sphincters competent; and to do that is to afford great relief. If you want to apply it to the sphincter of the bowel, the best plan is to put one sponge of the faradisation machine over the

sacrum, and the other well wetted, to the anus; and if you want to apply it to the sphincter of the bladder, you place one sponge, well wetted, on the perineum, just behind the scrotum, and the other over the symphysis pubis. By such means you may prevent the frequent involuntary passage of evacuations. I do not say that you will do it in all cases, but you will in some.

But, again, you get cases in which the disease of the spinal cord is such as to produce only incomplete paralysis. The limb is weak, the contractility is less than natural, and the nutrition is disposed to fail. Can electricity do anything there? I think it may do a great deal; these constitute the class of cases in which it does very much good. But here you must observe the caution I gave you in the last lecture—not to use too strong a current of electricity during the early days of an acute illness. If you suppose the patient to be suffering from the effects of a recent myelitis, meningitis, or hemorrhage into the cord, it is a very foolish thing to galvanise him. If, on the other hand, disease is creeping up slowly—*e.g.*, white softening, or chronic myelitis, or if it depends upon syphilitic meningitis that may have occurred some time ago, and led to some slowly-induced pressure on the cord,—you may, in such cases of partial spinal paralysis, find electricity very useful.

Here it is that I would especially distinguish between the faradic and the battery-current. Where there is wasting of the limb, the application of the battery-current has appeared to me much more efficacious and much less mischievous than the other, when it is applied in the manner I have described. When, on the contrary, there has been no such wasting of limb, it seems to me that faradisation has acted better, faradisation applied with wet sponges, and especially directed to the muscles. If the contractility of a muscle is good, and just in proportion as you find the contractility of a muscle good, your prognosis is bad, so far as electrical treatment is concerned. If you find, for instance, a limb perfectly paralysed, but contracting perfectly well to galvanism, or sometimes acting even in excess, you can do nothing more by applying galvanism to that limb. Your prognosis may, however, be good if you find the contractility diminished, but not lost. If it be wholly lost, the prognosis is bad; if absolutely good, the prognosis is bad; if between the two, it is in proportion to the improvement you can effect in the nutritive condition by one or two applications of the current.

I have to mention only one other point in these cases of spinal paralysis—cases of impotence. These cases are sometimes very much improved by the use of electricity applied in the same manner as for loss of power over the sphincter vesicæ.

9. Now a few words on paralysis from injury to or disease of the nerves—the third group. These cases are distinctly of the same class as those which Dr. Marshall Hall called “spinal paralysis.” Some persons have called them peripheral, local, or traumatic paralysis. So far as the contractility of the muscles is primarily concerned, it matters not whether you cut the nerves across or destroy the cord to which those nerves were attached. If you divide a nerve going to a muscle—as, for example, when the facial nerve is divided by disease in the bone—you have “spinal paralysis” of the facial nerve in the sense in which Dr. Marshall Hall used that word. The severance of muscles from the spinal centre may be complete or incomplete, and you can measure the amount of damage done by the amount of electric contractility that remains. If a muscle or a group of muscles has been for a time completely paralysed by a damage done to a nerve or by neuritis, and yet the morbid state of the nerve was of such kind that it might be repaired, then, although the nerve has recovered, the results of its disuse may remain, and imperfect paralysis may persist. For instance, take this example, which occurred to myself not very long ago. A man tried to lift a heavy portmanteau, strained himself in doing so, had great pain in his arm afterwards, and then most intense, indeed agonising, burning and tingling in the tips of his fingers and palm of the hand. After a time the pain disappeared, and then it was found that his hand was excessively weak and that the muscles were wasted. He had strained his forearm, injured its nerves, and set up some neuritis; but after the neuritis passed away there remained paralysis of the muscles, with wasting, and almost complete loss of electric irritability. It was not until some time after all these symptoms had occurred that he was treated electrically, and then the difficulty to be contended with was the wasted muscles. In looking at what he could do with his hand, we found that there was every movement of the hand that could be performed; he could bend all his fingers, separate them, and bring them together again; but he could not do this quickly, nor could he do it forcibly. There was partial paralysis of all the muscles of the hand, depending upon damage to the nerve, and also upon consecutive changes in the muscles. Electricity was applied to the forearm and hand, and the muscles soon improved in their nutrition; and with that improvement in the nutrition of the muscles the voluntary power returned. You may find a similar thing, now and then, in the case of facial palsy—paralysis persisting as the result of disease. Examined electrically, you find that there is a certain amount of contractility left, although it is defective. If you apply electricity after an interval of two or three weeks, you may often cure the case by a very few

applications; but if the paralysis has lasted for six months, you will find at first very little contractility indeed, and you will have to apply electricity again and again before you obtain any distinct marks of improvement. Sometimes there is slight restoration of voluntary power after even the first or second application, and then the subsequent improvement is very trifling. When the paralysis is imperfect, and the contractility is only diminished, you may accomplish much; but when the contractility has quite disappeared there is little or nothing that you can do. You never can tell, until you have made several applications of the current, whether or not the case is curable, for although a group of muscles may be completely paralysed to the will, there may be some few nerve tubules that have escaped destruction, and their functions may be slowly recalled.

The mode in which you should apply electricity in cases of local paralysis is the following:—Place one conductor, well wetted, over the trunk of the nerve, and the other over the muscles, *seriatim*. If you are using faradisation, you may keep the second conductor steady; if galvanism, you must move it about, in order to interrupt the current.

Paralysis of the third nerve, with ptosis or strabismus, may be treated by galvanism or faradism; in either case one pole should be placed behind the ear, in the hand, or on the cheek-bone, and the other should be applied to the lid. A weak current only should be used, and the application should be brief.

In paralysis of the seventh nerve, from simple exposure to cold, the best plan of using electricity is the electric brush. Place a well-wetted sponge behind the ear, and take the metallic brush, and brush it over the skin, so as to sting the face. If it have existed longer, and there be much wasting of muscle, the same rule applies; but here you should also operate upon the muscles; and I would advise you to use the battery-current for a certain number of times, until you find that its power of eliciting contraction diminishes, and then to apply faradisation.

10. And now a word or two about other kinds of paralysis depending more or less on some morbid condition of blood, or nerve, or muscle, or of all these elements together. And, first, let me direct your attention to poisoning by lead.

(a) I do not know the precise mode in which lead produces paralysis, or why it singles out particular muscles; but in those muscles which are affected, it is found that there is undue readiness of response to a slowly interrupted galvanic current, and greatly diminished contractility to faradisation and to a rapidly interrupted galvanism. Whatever may be the explana-

tion of these points, remember that it is not simply a question of difference in the kind of electricity applied; for, if you rapidly interrupt the battery-current, you find the muscles in lead-palsy do not act to that. The rapidity of the interruption may account for the inaction of faradisation; but why the muscles that are paralysed should act more readily than healthy muscles to a slowly interrupted current has not yet been explained. The mode of treating lead-palsy has been by faradisation, or by the application of the battery-current. You take a current from, say, five cells, apply it to the extensors of the hand, and you produce definite contraction. After a few applications you often find that five cells are not enough, you have to use seven or eight or ten; and in a few weeks of application you have to use quite as many to produce contraction as in a healthy limb. At first they are very sensitive to the battery-current; then gradually, as you apply it, they grow less so, and you then, curiously enough, find them brought back into their normal relationship to faradisation. There is no doubt about the fact that the improvement in nutrition, which seems to be brought about by the battery-current rather than by any other means, entails a loss of the morbid irritability to that battery-current, and with that improvement in nutrition you get a return of the normal contractility. If you have not a battery-current, you may use faradisation to begin with; but if you do, be quite sure that you affect the muscles. I have known patients with lead-palsy treated by having their hands in water and their feet in water while the current is passed from one to the other. Such a proceeding is not of the slightest good. If you were to apply one pole of a faradisation machine to the chimney-pot of a man's house, and the other to his doorstep, you would be about as likely to get the current into the muscles that you want to benefit. You must apply faradisation locally, with thoroughly well-wetted sponges, and of such low intensity that it is scarcely felt, and yet of sufficient strength for you to be certain that the muscles respond. Use it every day, and have particular muscles singled out—just those which are the most paralysed. In these cases it is often difficult to get the current into the limb; and you will find an advantage sometimes in soaking the limb by covering it, for an hour or two beforehand, with wet lint and oiled silk at the spots where you want to apply the sponges. Get the skin well moistened, and the current will pass through more readily.

(b) One word about the paralyses that come from anæmia, and are often met with in pale hysterical girls. Some are set down as hysterical without, I think, any just cause; they are more or less dependent probably on an altered blood state, which may affect the cerebral centres, and lead to these peculiar weaknesses.

I am quite sure that some of these local paralyses are relieved occasionally by static electricity administered in the mode I have described already, by sparks from the skin, or prime conductor, or by a Leyden phial. One of the forms which anæmic paralysis occasionally takes is that of loss of speech, or change of voice, dysphonia, or aphonia. It is often called hysterical aphonia. It may be hysterical, according to the use of the term by some people, but in many cases it exists quite alone and apart from anything that one ordinarily recognises as the hysterical temperament. When present there is almost invariably marked anæmia. Here sometimes a few sparks from the prime conductor of a machine will bring the voice back directly. Sometimes, if that will not do, the Leyden phial will immediately succeed, and this after you have applied electricity in other forms without success. A few sparks do not cause pain; but if you apply faradisation to the larynx, you do cause a great deal of pain. It is uncomfortable to have even a weak faradic current passed through the larynx, and it is often perfectly unsuccessful; and yet a spark, which causes no distress, will often bring back the voice at once. In certain cases it is desirable to introduce the current of faradisation right into the glottis; and this is so when there is distinct paralysis of the vocal cords. You may see with the laryngoscope that one or the other cord, or that both cords, are paralysed; and it is quite easy to apply faradisation to the larynx internally in the manner recommended by Dr. Morell Mackenzie. One pole is held in the hand, or applied to the nape of the neck; the larynx is well exposed; and the other pole is carried between the cords by an instrument constructed for this purpose. This is shaped like a catheter, with a small sponge at the end; and this sponge has a wire passing from it inside the catheter up into the handle, which is so connected with a key that you can either make or break the current by pressing on the key. Having placed the sponge in between the vocal cords, you touch the key and send the current through them. Patients will sometimes cry out the moment that the application is made, and you may very easily imagine that they would if they have any crying power left in them. But many patients prefer the internal faradisation of the larynx to the external, affirming that it is the less painful of the two.

11. There are a few words only which I wish to say about local spasms. The forms of spasm in which electricity has been most commonly used are "torticollis," a spasmodic condition of the muscles of the neck on one side; "writer's cramp"; and so-called "histrionic spasm" of the face. It is said that such cases have been cured, but my own experience has been unfortunate with regard to them. I have tried electricity again and again,

and in every available form, but have never seen it do any good. I have tried battery-currents, direct and indirect; I have tried faradisation weak and faradisation strong, with wet sponges and with dry; I have used static electricity also, and each form of electricity persistently; I have not given up because the treatment has done no good at first; but I do not know one single instance in which it ever seemed to me to do the smallest good. In torticollis, for the time being, you can put the head straight by either a strong battery-current passed through the contracting muscles, or by faradisation of the other side, the muscles of which are often weak; but directly you cease the application the head goes back again into its abnormal position. I have obtained similar negative results in cases of both writer's cramp and histrionic spasm. Others have been more successful, and I trust that your experience may resemble theirs rather than my own.

12. In painful affections such as the neuralgiæ, migraine, sciatica, tic douloureux, and the like, and also in some conditions of modified sensibility, such as the spontaneous feeling of heat or cold, the sense of numbness, of tingling, "pins and needles," or such like discomforts, electricity is often of considerable service. It is the continuous galvanic current which you should use, and it should be of only such strength as to be just perceptible by the patient; it should be applied to the part with well-wetted sponges, and should be applied for a short time only, but with frequent repetition. I know of nothing more distinct or more satisfactory in therapeutics than the relief which may often thus be given to suffering of the most intense character, the relief being very rapidly induced, and in many cases permanent. In applying galvanism to the head you must be very careful to avoid using such a strength as to cause vertigo or faintness, and I am sure that you may avoid these evils by trying the current upon your own head first, and then by carefully observing the patient, and stopping the application for a time the moment that there is any complaint, by word, gesture, or look, of any uneasiness in the head or epigastrium.

Electricity is one of the most powerful agents that you can employ in the treatment of disease; but it is useful, useless, or mischievous, according to the manner in which it is applied; and my endeavour has been to furnish you, by means of these lectures, with the information which shall enable you to derive help from it in diagnosis, and confer real advantage upon your patients by rightly directing its therapeutic powers.—*Lancet*, July 23, Sept. 3, and Oct. 15, 1870, pp. 109, 321, 530.

14.—COMPARATIVE VALUE OF THE GALVANIC AND FARADIC CURRENTS.

By Dr. A. D. ROCKWELL, New York.

Since the time of Remak, the comparative value of the galvanic and faradic currents in therapeutics has excited continual interest, and at one time was the subject of angry controversy. At the present day all electro-therapeutists who keep abreast of the progress of their department agree that both currents are of service; that one will fulfil certain conditions for which the other is inadequate, and that no one who expects to secure in practice the complete effects of electrization can dispense with either. Concerning the special indications for the use of one or the other, opinions widely and honestly differ, according to the opportunities and experience of each individual. In Germany, where the school of Remak is dominant, the galvanic is used more than the faradic; in France, at least among the disciples of Duchenne, the faradic more than the galvanic. In England and America both currents are employed, general practitioners using chiefly the faradic, while specialists use both with more or less exclusiveness.

Much of the confusion that exists concerning the differential indications for the use of the galvanic or faradic currents arises from an imperfect or erroneous or exaggerated conception of the distinctions in their physiological effects.

The general belief or supposition is that there is between them a radical and important difference in *kind*, and that an appreciation of this distinction is essential for a knowledge of the differential indications for their use. From the accumulating results of experiment and experience in electro-physiology, diagnosis, and therapeutics, we think that there is strong reason for regarding the essential distinction in the effects of these currents on the body as mainly of *degree*, and that this is the scientific basis for their differential employment.

Thus the galvanic current applied on the face and head produces flashes before the retina, while, as a rule, the faradic will not. We have, however, frequently treated certain sensitive pathological conditions where the same flashes were caused by the faradic. With the improvement in the general condition of such patients, this unusual susceptibility to the faradic influence always disappears. An important peculiarity of the galvanic current is that, when applied on the neck, it causes a metallic taste, and yet we have on several occasions treated cases of constitutional neuralgia combined with excessive irritability, where the same effect was markedly and even unpleasantly produced by the faradic current, when applied above the seventh cervical vertebra. Other well-recognised peculiarities in the effects of

the galvanic current, distinguishing it from those of the faradic, are *giddiness* and *vertigo*, when applied on or near the head, *diplegic contractions* and special sensations down the upper extremities and over the body, when applied to the cervical sympathetic; marked chemical effects, especially when used in large quantity, redness and burning sensations of the skin at the points on the surface where the electrodes are applied. All of these effects are observed in a less degree from the faradic current, and some of them in cases of great abnormal sensitiveness are very decided. When we come to study their therapeutic effects, we also find that both currents differ chiefly in degree. In the form of localized electrization, both can produce muscular contractions in paralyzed muscles and relieve local neuralgia; both cause absorption of abnormal secretions, and both can directly affect the brain, spinal cord, sympathetic, and all the internal organs, producing in different degrees, the various therapeutic results that directly and indirectly flow from electrical excitation of these parts. In the form of general electrization both currents, besides producing most of the results of localized electrization, act as powerfully stimulating tonics, and thus form most efficient aids in the relief and cure of nervous exhaustion, nervous dyspepsia, constitutional neuralgia, and of a wide range of nervous diseases associated with or dependent on general debility.

In electro-surgery both currents avail to discuss tumours, heal ulcers, and hasten absorption, although the galvanic current, when used in large quantity, produces cauterizing effects to which the faradic is unequal. And yet the difference in *degree* between the effects of the two currents is so marked and so clearly demonstrable as to be practically equivalent in certain instances to a difference in *kind*, and to give very important and remarkable advantages to one current or the other, according to the indications offered.

Advantages of the Galvanic over the Faradic Current.—The advantages of the galvanic over the faradic current are:—

1st. *A greater power of overcoming resistance.*

It therefore affects the brain, spinal cord, and sympathetic more powerfully than the faradic, since the anatomical position of these parts is such that considerable resistance must be overcome in order to directly affect them.

For the same reason it is usually to be preferred when it is desired to affect the middle and internal ear, the retina, and the muscles of the eye.

2nd. *A power of producing muscular contractions in cases where the faradic fails.*

This peculiarity of the galvanic current has been observed so frequently, and in such striking instances, that it has become an accepted fact of electro-therapeutical science.

After a certain amount of treatment by the galvanic current, the paralysed muscles frequently resume their susceptibility to the faradic.

3rd. *A different and far more potent chemical action.*

The chemical power of the galvanic current is most markedly seen when used for the purpose of galvano-cautery, or, "galvano-caustic chimique."

In order to produce the energetic caustic effects of the galvanic current, it is necessary to use elements that generate quantity of electricity, and to combine them in such a way that the quantity produced shall be very large, since an ordinary single element, or indeed a large number of elements arranged for intensity, exhibit only a comparatively feeble cauterizing effect. It is because the galvanic current can be thus arranged for quantity, more than in any difference in kind between the effects of the two currents, that it has so marked and peculiar a superiority to the faradic as to practically amount to a difference in kind. The quantity of the faradic can be but slightly increased, and hence, although it does possess some chemical virtues and produces slight chemical effects, it is not indicated where such effects must be very energetic or concentrated. The superior efficacy of the galvanic current to the faradic, so often observed in the treatment of neuralgia, of atrophied muscles, rheumatism, &c., is probably due to its greater chemical or catalytic action. It probably induces more rapid and more important molecular and other changes in the tissues.

Advantages of the Faradic over the Galvanic Current.—The advantages of the faradic over the galvanic current are these,—

1st. *By virtue of its frequent interruptions it more easily produces muscular contractions when passed over the muscles or the nerves that supply them.*

In order to produce muscular contractions with the galvanic current, it is necessary to interrupt the current, and, unless it is quite powerful, to localize at least one of the electrodes over the motor nerve by which the muscle is supplied. On the contrary, the faradic current is in a condition of rapid interruptions, and produces contractions when indifferently passed over the surface of the muscle, as well as when localized on the main motor nerve that supplies it. This advantage of the faradic current is best appreciated in *general electrization*, the powerful tonic effects of which are partly and quite largely due to the passive exercise, and consequent important changes of tissue that result from the several thousand muscular contractions that take place during an ordinary sitting. In localized elec-

trization this advantage is not so clearly or strongly marked, since in this method, by a proper knowledge of electro-therapeutical anatomy and sufficient care, it is possible to direct one of the electrodes on the motor points; and yet even here the faradic current is much more convenient, because its employment requires no arrangement for interruptions and less minuteness of attention to the situation of the "motor points." The exceptional cases of paralysis, where the muscles have lost their susceptibility to the faradic current, do not interfere with the general rule.

2nd. *It is less likely to produce unpleasant or harmful effects than the galvanic.*

In certain acute and chronic pathological conditions, where it is desirable to produce a decidedly stimulating effect without marked catalytic action, the faradic current can alone be used with benefit and safety. To confirm this statement, we rest mainly on the evident results of clinical observation. We recall at least two cases of severe neuralgia of the trigeminus, where a mild and rapidly interrupted faradic current, applied on several occasions, relieved the pain very decidedly.

In order to hasten recovery, the constant current from but four of Bunsen's cells was for a moment directed along the course of the painful nerve. In both instances the neuralgia immediately returned with increased severity, but was relieved a second time, and soon recovered under the influence of the current first named. We may indeed refer to a number of cases of severe constitutional neuralgia and excessive nervous exhaustion where the faradic current invariably relieved, and where the galvanic as invariably aggravated the symptoms.

Our own experience teaches, that wherever the constant current can be used without injury, there also will a faradic current of relative intensity be harmless. It teaches further, as above stated, that in certain conditions where the faradic current is not only harmless, but of decided benefit, the galvanic, even when its tension is very slight, may occasion evil results.

Galvanization of the Sympathetic.—One of the most important advantages possessed by the galvanic over the faradic current is the readiness with which the former affects the sympathetic.

The attention of the profession was first called to this fact by Remak, who observed the occurrence of diplegic contractions when the superior cervical sympathetic was submitted to the influence of the constant current.

This observation of Remak was confirmed by Fieber, who produced similar phenomena in the living animal by exposing the sympathetic and directly galvanizing it.

It does not come within the scope of this short paper to theorize at length concerning the beneficial results following galvanization of the sympathetic.

In those cases of paralysis of vaso-motor nerves and arterial spasm that are benefited by this method of treatment, the favourable results may be ascribed in brief to the influence exerted on the vaso-motor nerves.

The few following cases may serve to illustrate some points in the above remarks:—

Case of Persistent and Excessive Nausea.—*Recovery follows Galvanization of the Sympathetic.*—Mr. H. S., a tall spare man, aged 49, was the victim of a mild form of nervous dyspepsia, from which he had suffered slightly for many years. Some three years since, a very annoying symptom supervened. Every morning soon after breakfast he observed a feeling of nausea that lasted a short time and then passed away.

This symptom gradually increased in severity and duration, until it became most distressing, and for more than two years no form of medication had afforded more than temporary relief. We first made use of the faradic current by the method of general electrization, directing the applications more especially to the back of the neck, so as to affect, as far as possible, the sympathetic. As no relief followed, we resorted to the galvanic current, applying the positive pole at the inner border of the sternocleido-mastoideus muscle and the negative at the sixth cervical vertebra, and allowed a mild uninterrupted current to pass for three minutes. By this method the sympathetic was decidedly influenced, and relief was afforded. Succeeding applications gradually reduced the intensity of the nausea until the tenth séance, when it disappeared completely and has not since returned.

Case of Disordered Nervous Action relieved by Galvanization of the Sympathetic.—Mr. H., aged 40, complained of an unpleasant feeling of constriction in the throat, and a constant pricking or tingling in the arms and hands. The patient, who was of a highly nervous organization, stated that these symptoms had existed for a number of years. During the last few months, however, they had become so decidedly aggravated as to excite alarm, and impelled him to seek professional advice.

A number of general applications with the faradic current were administered without special result. We then resolved to influence the sympathetic by the galvanic current.

The first application to either cervical sympathetic excited a decided perspiration in both axillæ and along the inner side of the arms. The symptoms of which he complained became rapidly less marked, and after twelve applications ceased to annoy him.

Patients suffering from cerebral effusions frequently speak of an unpleasant roughness in the eye. This symptom may probably be ascribed to dilatation of the smaller blood-vessels through weakness of the vaso-motor nerves. We have found that this condition is almost invariably relieved by galvanization of the cervical sympathetic.

An aggravated Case of Chorea resists the Action of the Galvanic, but yields to General Electrization with the Faradic Current.—The little patient in whose case the results of treatment by the faradic current were so gratifying, was under the professional care of Dr. J. O. Farrington.

Dr. George T. Elliot was called in consultation, and by these gentlemen electricity was advised.

Some two months previous to the consultation certain abnormal movements—such as starting suddenly to his feet, throwing out a hand, or a foot, &c.—were observed by the teacher of the boy. Two weeks subsequently, the patient was seized with well-marked choreic symptoms of the right side of the body, and in two days the disturbance extended to the opposite side. So constant and violent were the movements of his arms and legs that it was impossible to keep him on a bed or sofa. It was necessary to place him on the carpet, surrounded by inflated rubber bags. Intelligence seemed to be perfect, but the power of speech was lost, and the sufferer made known his wants by impatient cries and ill-directed motions.

Sleep was impossible without the nightly administration of an opiate. Contrary to our judgment, but by suggestion, we commenced treatment by the use of a mild galvanic current directed especially to the base of the brain and the spinal tract; but this method served only to aggravate the child's condition. We then resorted to the faradic current by the method of general electrization, but so violent were the involuntary movements in the limbs and body of the patient, that it was with difficulty that he could be held in a sitting posture and his feet kept on the copper plate to which the negative pole was attached. The applications were *general*—every portion of the body, from the head to the feet, being influenced on each occasion.

Improvement was manifest from the very first. He was at once enabled to sleep soundly, although his opiate was reduced one-third, and after the fourth application it was dispensed with altogether. In the course of three weeks, during which time fifteen applications were given, the case was so far improved that the patient was able to utter distinctly words and sentences. The choreic symptoms were so much diminished that the boy could readily sit quiet and alone, and during an application was able to command the movements of his body and feet. Improvement continued during the administration

of a few more applications, when the child was taken to the sea-shore, where in two weeks he quite recovered. Some three months since, after having enjoyed excellent health for a year and a half, the boy suffered from a second attack. He was immediately subjected to the influence of electrization, and recovered even more rapidly than before.—*New York Medical Record*, June 1, 1870, p. 152.

15.—CASES OF NEURALGIA.

From a Report of Practice at the Royal Infirmary, Edinburgh.

Case 1.—Neuralgia of Supraorbital Nerve: Division of Nerve: Recovery.—W. D., aged 40, a gamekeeper, was in other respects a healthy man. He had suffered from tic in the jaw for five years. The pain during that time, although not constant, had occurred in paroxysms almost daily, and was usually very severe. Commencing at the supraorbital foramen, the pain passed downwards over the right cheek and upwards to the forehead; and for some months past it had been of a most excruciating lancinating character. He had been treated by many of the most skilful practitioners with almost every conceivable remedy for the affection, both internal and external, including quinine, iodide of potassium, mercury in large and small doses; purgatives of all sorts, such as croton oil; liniments of every description; chloroform, blisters, opium in all shapes, endermically and hypodermically; aconite, iron, bebeeru, etc.; but all without relief.

Upon examination, the teeth were found all sound. The pain was daily intense, and lately had become so agonising that the general health was beginning to suffer. As the patient was willing to submit to any measure likely to procure relief, the following operation was performed.

Dr. Joseph Bell made a T-shaped incision over the supra-orbital foramen, and exposed the nerve. A portion of this, about the third of an inch in length, was excised. On coming out from the effects of the chloroform, the patient stated that the neuralgic pain had disappeared; and from this time till the present it has never returned. He was discharged from the hospital about a week afterwards, perfectly well, and without having experienced the slightest twinge from the pain from which he had been suffering for so many years.

In connection with this case, Dr. Joseph Bell remarked that in his experience the above result, with a few exceptions, generally followed division of the nerve in this affection; the recovery, however, being only temporary. The patient, he says, usually remains perfectly free from suffering for three or four months, after which time the pain gradually returns, and the operation has again to be performed, with a like result.

Case 2.—Neuralgia of Dental Nerve, treated with Hydrate of Chloral: Relief.—J. F., aged 65, had, for the last six months, been suffering from neuralgia of the dental nerve of the right side. The pain was intense, occurring in paroxysms almost hourly, and shooting downwards in a lancinating manner throughout the entire course of the dental nerve. For the relief of this, nearly all the teeth of that side had been removed; and all the ordinary remedies, both internal and external, had been employed without effect. On admission, he was suffering the most intense agony, and he was emaciated and careworn from constant suffering. Hypodermic injections of bimeconate of morphia and atropine, with bebecru, quinine and iron internally, were administered without any beneficial effect. It was determined to give the hydrate of chloral a trial. Forty grains were taken in the morning. In the course of ten minutes, the pain began sensibly to diminish, then gradually continued to decrease in severity, and in ten minutes more altogether disappeared. During this time he had not the slightest desire to sleep. The patient remained in perfect comfort for about half an hour, at the end of which time the neuralgia again gradually returned. Another dose of the medicine produced the same relief, which, however, never lasted more than about half an hour. This experiment was frequently repeated, and always with similar results; but it was remarked that in the course of a week the chloral, even although the dose was greatly increased, seemed to lose this anodyne effect, and did not relieve pain without causing sleep. As a commentary upon this case it may be stated that, after all the ordinary remedies failed to remove this distressing symptom, chloral produced temporary relief. The remarkable feature, however, is that chloral, contrary to the general opinion of its action, seemed to produce in this instance a true anodyne effect, viz., the relief of pain without causing sleep. That this was not altogether a coincidence was shown by the repeated observations made upon the case, the administration of the drug always being followed by temporary cessation of pain. Lastly, it would appear that here chloral lost its effect upon the system; as, to produce in this man beneficial results, the dose had to be gradually increased; and, finally, although he took so much as seventy grains, no anodyne action followed.—*British Medical Journal*, May 21, 1870, p. 519.

16.—SCIATICA: ITS TREATMENT BY ELECTRICITY.

By Dr. HENRY LAWSON, Assistant Physician to St. Mary's Hospital.

[This article may be considered supplementary to the one in our last volume, at page 44.]

Of the forms of dynamic electricity, that which is most often, though not most scientifically applied, is the faradic. Faraday's machine—the induction coil—enables a small battery (a single Smee's or bichromate cell) or an arrangement of magnet to develop a very intense electric vibration—the power depending on the length and character of the wire in the coil—which, however, has these peculiarities; firstly, each individual vibration is momentary, and each succeeding one differs, as to the direction in which the current passes, from its fellow.

By the induction coil, we are enabled to produce a series of rapidly successive currents of a force (therapeutically speaking) which can be graduated by means of a contrivance that practically reduces the extent of the coil.

This used to consist in withdrawing the soft iron bar from the coil, and now consists of a tube of copper closed at one end, and which, sliding over the coil, allows us to bring as much or as little of it into action as we please. It will be well then, to bear in mind that, whether we use what is called a volta-induction coil, or a magneto-induction coil, we are in each case employing faradisation, and that while applying the instrument, we are causing two currents passing in opposite directions, and rapidly alternating with each other, to traverse the parts of the patient included between the two poles.

Now, there is a further point in regard to the application of faradisation, which is of importance in the treatment of disease. It is a matter of considerable moment how the electricity is applied. It may be so contrived, as that the current is, so to speak, split up, and distributed over a considerable surface, or caused to penetrate the skin, and then affect the muscles. My experience of faradisation in sciatica leads me to oppose very decidedly the use of the ordinary conductors—the brass tubes filled with moistened sponge. When in a case of severe sciatica, a case in which locomotion has become painful, and the limb is kept constantly flexed, faradisation is used in this way, the result is most baneful. The (in both senses) irritable muscles are according to the strength of the current, thrown into violent contraction, and the patient is left in excruciating agony for several hours after the operation. The only—so far as I know—admissible method of applying faradisation in sciatic cases, is that in which a good sized pair of metallic brushes (such as are now sold with every Medical induction coil) are employed as conductors; these so distribute the current as to affect but slightly the subjacent muscles, while they produce a great deal of surface-irritation and hyperæmia. As to the extent of the coil to be used, or in other, and more popular language, the strength of the current to be administered, that must be absolutely left to the discrimination of the operator, who should

invariably begin with a feeble current, and increase it gradually up to the point of endurance on the part of the patient. Some persons have an epidermis highly sensitive, while others have a skin which contains such a mass of corneous non-conducting material, that it may fairly be called a hide. In no case should the application be persisted in for more than ten minutes at a *séance*, and though in course of time it may be used three times a day, it will be advisable to limit the application at first to once in the twenty-four hours.

A great deal is said and written about the part to which the positive and negative poles are respectively to be applied. I must say I think there is nothing to warrant the belief that there is—in cases where metallic brushes are used as conductors the least difference therapeutically whether the positive pole is placed in one position or another. I am disposed to think that the same holds good too in regard to application of faradic electricity in all cases, but of this I shall say more on another occasion. It seems to me therefore (but I shall be glad to know the opinions of those of my professional brethren who have considered the subject on this point) that the medical man who is about to apply faradic electricity to the treatment of sciatica need not trouble himself about either primary or secondary currents or about positive and negative poles, but need simply apply the brushes to the limb in the following manner:—The brushes should have the wires expanded fanwise. Then, one being placed above, near the sciatic notch, and the other at about the junction of the middle and lower third of the thigh in the direction of the sciatic nerve, one brush should, while firmly pressed against the skin, be made to approach the other, either being kept fixed. After a few brushings the local effects will exhibit themselves, and the application should then be suspended.

It may perhaps appear singular that I should have entered into such details concerning a therapeutic method which I cannot hopefully recommend in the cure of sciatica, but it is, nevertheless, true that my opinion of faradic electricity in these cases is that it may be either extremely injurious or very slightly beneficial. Ere I had learnt practically the sad consequences of applying the induction current so as to contract the muscles, I tried this mode only. Subsequently I employed the plan already stated. The result was generally *nil*; but in some few cases, just those kinds in which liniments proved useful, it was alleviative. Still, as I doubt not that electricity will be one of the great medical engines of the future, I have thought it right to say all I had got to say on the subject even of faradisation.

Galvanisation or the use of the continuous galvanic current has long been used, and with varying success as to the treat-

ment of sciatica. Remak spoke of the results of this mode of treatment in such laudatory terms that his cures appear to have been little short of miracles. Other therapeutists, and among them not a few English physicians, have also tried galvanisation but they have not reported so favourably of its effects. I have experienced the effects of the continuous current myself and I have watched its results in some of my patients, and I am prepared to say that we have in galvanism a remedy which, under other conditions than those under which it is now employed, will prove most valuable in the future. I do not in the least doubt the pain-relieving power of the current from the galvanic battery. I have felt it in my own case and have seen it in the case of patients, but I must also say that the difficulty of applying the current, owing to the densely non-conductory character of the skin, the troublesome nature of the operation, the almost impossibility of keeping up a constant current for months, and our ignorance of the relative physiological merits of what are called intensity and quantity, and of the therapeutic difference between a single huge cell with large surface and a large number of small cells, all render the employment of galvanism in an affection like sciatica more interesting to the scientific physician than beneficial to the patient. I would not have it supposed that I deny galvanism to be a remedy in so-called rheumatics, but when we have—as in hypodermic injection of morphia—a safe, certain, rapid, and convenient remedy of another kind we must not resort to one which, however attractive to the therapist, is really of not much practical use to the patient.

I shall not attempt the herculean task of describing the various forms of galvanic batteries now in use, but would merely remark that, besides the ordinary combination known as Daniell's, of which from 70 to 100 cells are generally employed for medical purposes, several convenient forms, consisting of fewer cells of much greater individual intensity, have of late been offered for sale by the English instrument makers, and in the present phase of electro-therapeutics, the physician must absolutely be left to his own choice. Some are in the habit of attaching a galvanometer to the battery, and I believe that of these not a few imagine this apparatus to be a sort of gauge of the therapeutical strength of the combination, this being, they fancy, indicated by the deflexion of the needle. It is needless to tell the student of *physics* how absurd is any notion of this kind, but it is necessary to inform the student of *physic* that in electro-therapeutics the galvanometer is of no real use. We want some handy means of estimating the exact intensity and quantity of the current at any time produced by our batteries, but, unfortunately, the method which can be used for one of these purposes is too complex for medical practitioners.

The physician's best guide, though it is at most an inconstant one, will be the sensation produced when one pole is placed in the hand and the other is brushed lightly along the skin of the wrist.

In applying the galvanic current, the patient should recline on a couch, with the hip and outer side of the affected limb exposed and uppermost. The sponges of the conductors being then moistened, one should be applied to the skin just above the point of exit of the nerve from the trunk, and the other over the seat of the nerve at about the commencement of the lower third of the thigh; if the skin be, as it often is, of a tough character, it will be well to apply for twenty-four hours previously, a small cold-water dressing over the parts against which the poles are pressed. By this means the skin becomes saturated with water and is thus made a better conductor. But it may be asked, does it matter whether the positive pole is placed above or below? and this is, of all questions in electro-therapeutics, the one, perhaps, that on which the evidence forthcoming is least satisfactory, owing to the way in which the experiences of different workers conflict. My knowledge is certainly a very limited one, which I hope to enlarge now that an electrical room is about to be established at St. Mary's Hospital, but so far as it extends it teaches me that the inverse, and not the direct current, is the one which produces most relief in cases of sciatica. The galvanic current, being supposed to travel from the positive towards the negative pole, we may roughly define the inverse current as that in which the current is supposed to travel towards the central nervous system, and the direct that in which it travels towards the periphery. Now, when first I applied the galvanic current, I imagined that the most natural method was to apply the positive pole near the root of the nerve, and the negative below. My readers will then judge of my surprise when I found that this plan, both in my own case and in that of others, while it apparently gave some ease during the operation, appeared to intensify the pain for hours subsequent. I next adopted the inverse current; I placed the positive pole below and higher up, and the negative on the skin near the exit of the nerve, and I found that this resulted in the production of more ease than any other plan. Now, why this should be, must, I fear, in the existing state of therapeutics, remain a mystery, but I am disposed to regard it as a fact, and I shall be very glad if some of my readers will give the plan a fair trial, and will communicate their results to these pages. I am aware that Remak gives very elaborate instructions as to the conditions under which the negative pole is to be applied to the painful point, but no one, I venture to say, but Remak himself could have estimated these conditions properly.

As I have already stated, the relief afforded by the continuous current, whilst it is unquestionable and immediate, is neither of long duration nor of great extent. For some few hours the limb feels somewhat "deadened," so to speak, and the suffering is certainly more tolerable, but this condition of things does not last long, and the pain is even under the best circumstances not entirely banished. If the hypodermic injection could not be employed, then I should say that our most useful remedy for sciatica was the galvanic current, but when I compare the two plans, when I think of the difficulty, nay the almost impossibility of administering electricity at the patient's residence, and of the tedious character of the operation, and when, on the other hand, I know how sure, safe, and expeditious is the subcutaneous remedy, I am bound to say that galvanism, while it should still be used (in special cases), is really of little value in the great majority of cases of so-called rheumatics.—*Medical Times and Gazette*, July 30, 1870, p. 120.

17.—ON THE TREATMENT OF SCIATICA.

By Dr. J. WARING-CURRAN.

[Hypodermic injection of morphia is a wonderful remedy in sciatica, but unfortunately the pain often returns with increased severity as soon as the effects of the morphia pass off. For some years Dr. Curran has employed the following treatment, and he states that it is safer, surer, and more satisfactory than any treatment or method of treatment he has anywhere observed.]

In a small porcelain vessel I mix one grain of morphine and three grains of extract of belladonna with six drops of creosote. I get my patient out of bed, standing as erect as the nature of his disease will permit him, and began making small incisions, half an inch long, with an intervening space of three inches between each incision, cutting only through the skin and subcutaneous cellular tissues. I make the incisions alternate on each side of the nerve, beginning underneath the fold of the *gluteus maximus*. Having wiped off the effused blood, I quickly rub in the composition. The morphine and belladonna allay the pain, and the creosote sets up, if properly applied, a certain amount of local irritation, which is very desirable. M. du Chaillu, in his exhaustive and popular work on the gorilla, records a somewhat similar procedure existing amongst the Celond races. If my memory serves me, caustic lime is the agent he records as being employed.

To every patient suffering from sciatica, I exhibit iodide of ammonium, and I have remarked, as I hope soon to show, that

its therapeutic power is superior to the iodide of potassium, but in no complaint will this be appreciated more than in the *eruption* stages of syphilis and in diseases of the glandular system. The patient bent double with acute pain, will be found after the incisions are made and the morphine composition rubbed in, able to move his leg freely in any direction. There is, of course, a numb feeling experienced, but the liberation from acute suffering provokes an expression of gratitude, which is conclusive evidence of the value of the plan of treatment advocated.—*Medical Press and Circular*, April 20, 1870, p. 310.

18.—NEURALGIA OF THE WALLS OF THE CHEST.

By Dr. JOHN CHAPMAN, Physician to the Farringdon Dispensary.

Writers on neuralgia usually advert to neuralgic affections of the walls of the chest under the names of pleurodynia, inframammary pain, and intercostal neuralgia, but, excepting angina-pectoris, neuralgic affections of the thoracic viscera are not often systematically or distinctly adverted to. They are, however, in my opinion, of frequent occurrence, and it is more vitally important to detect and arrest them than any other forms of the malady. No physician who carefully studies the variations in the vascular condition of the thoracic integuments of persons in whom the nervous system is liable to disorder by slight causes can fail to be struck by the fact that the surface of the chest, and especially of the mammæ, exhibits great and often rapid changes of temperature, frequently associated with more or less congestion, and with tenderness, considerable pain being produced by slight pressure. In such cases the patients frequently complain of a dull aching pain within the chest, generally beneath the clavicle—sometimes on one side, sometimes on both. But the most careful examination by means of percussion and the stethoscope fails to elicit any evidence of *structural change*—a phrase denoting, as ordinarily understood, change of a more or less gross and palpable character; but though the ordinary method of physical exploration of the lungs fails in the cases in question to reveal any structural change, I have no doubt whatever of its existence, and feel assured that it consists in the initial stage of conditions too often ultimately appreciable by the stethoscope—viz., disordered nutrition in the form of anæmia, hyperæmia, or congestion. Those primary vaso-motor nerve centres which preside over the blood vessels of the chest walls are also intimately related functionally to those of the lungs themselves; and careful observations many times repeated have convinced me that the temperature and vascular condition of the thoracic integuments at any given

time are reliable indices of the state of circulation within the nutrient vessels of the pulmonary tissue.

Persons complaining of pain in the chest, but in whom no structural cause for it can be found, often exhibit those irregularities of circulation, and consequently of temperature, in the thoracic integuments which I have just mentioned; and I have satisfied myself that those irregularities and that aching of the lungs occurring simultaneously, are induced by nervous agency: the morbid influence, originating in various remote causes—sometimes within the body, sometimes without—is reflected by the vaso-motor nerve centres on to the blood vessels, causing different disorders of the circulation; and, not infrequently I apprehend, sensory nerve centres related to the lungs are rendered hyperæmic in the manner already described, and become productive of pain referred to some part of the chest. I am acquainted with two cases in which sewing speedily induces chest-ache, and with another in which playing the piano does the same.

When adverting hereafter to uterine neuralgia, I shall mention some analogous facts illustrative and confirmatory of what I have just said. The character of the pain experienced in these cases differs greatly in different persons. It is sometimes dull and peculiarly depressing, accompanied with a feeling as if the chest were constricted, or subject to powerful external pressure; sometimes it is gnawing or burning, and sometimes as if a hot iron rod were fixed within the affected part. A copious secretion of bronchial mucus, often so copious as to be fitly designated bronchorrhœa, is a not infrequent symptom in such cases, and even pulmonary hemorrhage may sometimes occur. Patients suffering in this way are of course apprehensive that their sufferings denote the existence of grave structural injury within the chest, but their ordinary medical attendants finding no physical signs of pulmonary disease, and finding, moreover, that the pulmonary pain is occasionally associated with acute pain in the arms—now in one arm, now in the other, and sometimes in both—ascribe the symptoms in question to rheumatism or hysteria. But notwithstanding the assurances of the physician that there is no cause for anxiety, the patient continues to feel the reality of the pain complained of; and if the vaso-motor nerve centres are extensively and persistently irritated so as to become permanently hyperæmic, there will be slow wasting of both the thoracic integuments and of the lungs themselves. The lungs will contract, the chest walls will sink inwards, the voice will be more or less suppressed, the strength will decline, and the symptoms of pulmonary consumption may be so well simulated, that both the patient and her friends (in these cases the patient is generally feminine) feel assured that

she is the victim of that disease, notwithstanding the fact that the several physicians who may have been successively consulted declare that her lungs contain no tubercular deposit. Indeed, I believe that such cases do occasionally prove fatal, and I entertain no doubt but that actual phthisis is often inaugurated by, and developed out of, the morbid conditions here described. —*Medical Mirror*, Sept. 1, 1870, p. 169.

19.—ON NEURALGIA OF THE LEG AND FOOT.

By Dr. JOHN CHAPMAN, Physician to the Farringdon Dispensary.

The ordinary neuralgic affections which occur in the leg and foot usually present no features requiring special comment. The pains are prone to be peculiarly vagrant or mobile, but according to my observations their most favourite seats are the heels, ankles, and toes. Sometimes the affected part of the foot is slightly swollen, red, and hot. Generally, no local change is observable; occasionally, the pain is associated with marked coldness of the feet. Pain in the sole of the foot, sometimes of an excruciating kind, has been described by a few authors under the name of plantar neuralgia. I have frequently met with it as a fugitive trouble, but never as an abiding malady. Although neuralgia of the leg and foot may be and often is restricted to some one spot, generally it is not so, but flies from part to part, and is associated with neuralgia more or less fixed and intense in the upper part of the limb. Of course, if the pains are seated chiefly along its inner side, we are justified in inferring that the lumbar segments of the cord are morbidly affected, and we may find tenderness on pressure of the lowest dorsal spinous processes; whereas, if the pain pervades principally the outer, posterior, or plantar surface of the limb, we know that the branches of the sciatic nerve, and therefore the sacral segments of the cord are chiefly involved. But there are doubtless many cases in which the nerves distributed to the leg and foot from both the lumbar and sacral portion of the cord are the media of pain at one and the same time.

Knee-ache.—Having already adverted to crural and sciatic neuralgia, each of which includes pains in the knee, as well as in the leg and foot, I lay myself open to the charge of repetition by troubling the reader with the following remarks on the special neuralgic affections of the knee. But as neuralgia of the knee and often of the leg and foot cannot be referred either to the anterior crural or to the sciatic nerve exclusively, it seems to me expedient to treat of these maladies separately.

The knees receive a very great amount of nervous influence, which reaches them through several channels and from different

sources. Nearly all the segments of the cord from the first lumbar downwards contribute to their innervation, which, however, is mainly effected by the lumbar portion. Branches from the external cutaneous, the obturator, the anterior crural, and the internal saphenous nerves, as well as branches (usually three) from the great sciatic cluster about and animate those important parts of the locomotive organs. It is, therefore, to be expected that the knees should especially become seats of suffering; and though knee-ache, or gonalgia, is not specially described in treatises on neuralgia, it is undoubtedly a neuralgic affection extremely common and extremely distressing; but as its victims are for the most part women who evidently hold it to be a part of woman's lot to bear an immense amount of pain, and therefore suffer in silence, little is heard of this form of neuralgia. As a matter of fact, however, the suffering incident to a large proportion of uterine maladies, especially those in which dysmenorrhœa is a prominent feature, is aggravated by aching of the knees; sometimes the pain, which is generally of a dull and diffused kind, pervades both alike; sometimes it is much more intense in one than in the other. Habitual sufferers from this affection are mostly troubled with it at their catamenial periods, and remain wholly free from it during the intervals. There are, however, many cases in which one knee only is affected, and in which the pain recurs quite independently of the menstrual functions. Not long ago I was consulted respecting a case of this kind. The patient, a lady, suffered excruciating pain in one knee, in which there was no so-called "structural disease." But during the access of extreme pain, which was paroxysmal, with intervals of almost complete relief, the surface of the joint became hyperæmic, red, and tender, and the joint itself, though not thickened so as to lose its normal outline, was distinctly swollen and puffy. It also exhibited at different times an appreciable variation of temperature. It was hot during the paroxysms, and cool during the intervals. In many cases of the kind previously adverted to this variation of temperature is very striking; but in them the decrease rather than the increase of heat is most notable, the knees being as cold as are the feet of those patients who habitually suffer from coldness of the lower extremities. Very often when aching and coldness of the knees co-exist, these are associated with remarkable instability of circulation in the vasomotor nerve centres, and a consequent habit of alternate shivering and flushing, which are inducible by astonishingly slight causes. If it be true that pain in the knees is possible only by virtue of a modification of condition in those nervous centres to which the nerves just enumerated are related, it is obvious that only such treatment as is capable of affecting the state of

those centres is likely to cure the malady in question. Before determining in cases of knee-ache what treatment shall be adopted, care must of course be taken to distinguish pain which is ordinarily understood as neuralgia from pain in the knee originating in and reflected from disease of the hip-joint. But even the reflexion of this pain may, I apprehend, be either prevented or lessened by the proper use of the spinal ice-bag.

Sir Benjamin Brodie found that a fifth part of all the women who consulted him on account of pains in the joints were suffering from what he considered to be hysterical arthralgia. Of course in many of these cases the knee was the part affected. Now I do not hesitate to express my decided opinion that in proportion as our knowledge of the physiology and pathology of the nervous system increases, that extensive region of disease called hysteria (an admirable disguise of conscious ignorance in the garb of occult wisdom) will be gradually appropriated by science, and allotted in separate sections, according to their special characteristics, to the different departments of intelligible neuro-pathology, so that at length hysteria, as a generic name of an extensive group of diseases, the true nature of which has until this day been either unknown or misunderstood, will be banished from nosography. Hysterical disease of the knee-joint will be translated,—a morbid affection including hyperæmia of either the lumbar, or sacral segments of the spinal cord, or of the whole together. In the excellent article on Hysteria contributed by Mr. Savory to the “System of Surgery,” edited by Mr. Holmes, the author describes “hysterical” disease of the joints; but in doing so he does but depict with admirable fidelity cases of neuralgia the pathology of which has been fully explained in the preceding pages, “A girl,” he says, “will complain of severe pain and tenderness in the knee. The joint is fixed and immovable, and any attempt to move it elicits loud cries. But the tenderness is excessive and superficial, so that she complains more when the skin is touched than when the heel is pressed upwards. There is frequently, too, a tendency to spasm; but this is different from the painful and involuntary startings of the limbs at night in the real disease. Often also the leg is fixed in the extended position, whereas in real disease of the joint it is generally bent. However, to this rule there are abundant exceptions. The joint does not undergo any material alteration in size and shape, although there is often some degree of fulness—a puffy swelling. In some cases the enlargement may be considerable; but when this occurs it is due to some local applications which have been previously employed. The joint, and indeed the whole limb, is very subject to frequent variations in temperature. Thus, in the morning the limb may be cold, and of a pale or purple colour, as if

there were scarcely any circulation of blood in it; while towards afternoon it becomes warm, and in the evening is actually hot to the touch, with the vessels turgid and the skin shining. Moreover, there is always a sense of weakness in the limbs, which after a while is partially due to the condition of the muscles consequent on their inaction. Then there is absence of constitutional symptoms. Although the sleep may be disturbed, and the patient watchful, there is not that almost entire absence of it which is so serious a feature in destructive disease of the joint. There is here a sufficient proportion of sleep for the necessities of the system. All this having existed without any material alteration for some time, with perhaps general debility or some local disturbance, proves the affection to be hysterical."

Cramp of the Leg and Foot.—The most general and characteristic pain experienced below the knee is that accompanying cramp of the muscles of the calf; and when it is borne in mind how considerable are the sources of irritation in the pelvic viscera, and that all irritation arising in them is liable to be reflected downwards through motor nerves originating in the lumbar or the sacral segments of the cord, as well as to produce consciousness of pain referred to the peripheral extremities of other sensory nerves, the frequent occurrence of cramp in the muscles of the lower extremities is easily intelligible. But why the sural muscles are much more frequently affected with spasm than are the other muscles of the limb is, perhaps, not so easily explicable. I am disposed to believe, however, that the cause of the phenomenon lies in the fact that the immensely powerful muscles of the calf are less completely counterbalanced by antagonistic muscles than are any other considerable muscles either in the lower extremity or in other parts of the body. During sleep, when the action of the will is suspended, and the automatic or purely excito-motor nerve-force has free play, any morbid irritation converging in the sacral segments of the spinal cord is likely to be reflected on the several muscles of the limb in quantities proportionate to their size and the amount of their innervation. As the muscles on the anterior part of the leg are in respect to size and strength far inferior to those forming the calf, they cannot, unless we aid them by standing upright, maintain the foot equally balanced between them and the sural muscles, and thus at a right angle with the leg. There is a like but less remarkable preponderance of the muscles in the sole of the foot over those on its dorsal aspect. Indeed, this disposition of the muscles of the leg and foot is analogous to that of the muscles of the fore-arm and hand, the flexors of which far exceed their corresponding extensors in strength. Very often when the muscles of the calf are affected with cramps, those of

the sole of the foot are also; and sometimes the latter are the exclusive seat of violent and intensely painful cramp. Seeing the great relative strength of the flexors of the wrist and hand, and that notwithstanding this fact cramp rarely occurs in those muscles, the explanation I have suggested of the frequency of cramp in the muscles of the calf and of the sole of the foot seems to be invalidated. It must be borne in mind, however, that the lower segments of the spinal cord which govern the lower extremities are more completely automatic than are those which preside over the upper extremities, and that the cramps in question generally come on during sleep. Now, obviously, when the will is quiescent, those parts of the spinal cord which are most capable of acting independently, as the involuntary nervous centres do, will do so on very slight provocation; and this, in my opinion, is the reason why during sleep that part of the cord innervating the lower extremities are most prone to independent action, and why, therefore, cramp, which rarely occurs in the arms, occurs very often in the legs.

The precise mode in which the terrible pains incident to cramp are produced is, in so far as I am aware, unknown, though as it seems to me, it is easily conceivable. When dense fibrous textures like to that of the sclerotic coat of the eyeball, for instance, are inflamed, they are excruciatingly painful, and the intensity of the pain in these cases is usually explained by saying that as the affected textures are unyielding, the swelling associated with their inflammation causes the nerve filaments distributed to them to be pressed upon from every side, and that this abnormal pressure causes the extreme pain in question. This explanation is probably as true as it is simple; and as the textural conditions out of which the pain arises are somewhat analogous to those of cramp, the explanation of the origin of that pain countenances the idea I expressed concerning the source of the pain incident to cramp, when adverting to the so-called neuralgia of the portio dura. When muscles are intensely contracted, they become, like fibrous textures, dense and hard, and it seems inevitable that they must then exert great and abnormal pressure on the nerves pervading them, and thus originate violent pain exactly as the pressure incident to inflammation of fibrous textures is said to do.—*Medical Mirror*, Aug. 1, 1870, p. 152.

20.—TRAUMATIC TETANUS.

By ANDREW BOUTFLOWER, Esq., House-Surgeon to the Manchester Royal Infirmary.

[Elizabeth E. B., 16 years of age, was a patient of Mr. Southam's, at the Manchester Royal Infirmary, admitted on

February 3rd, 1870, with symptoms of tetanus, which appeared on the twelfth day after compound fracture of the first finger of the left hand.]

There was considerable rigidity of the limbs, and particularly of the abdominal muscles, there was also some degree of opisthotonos.

About every half hour she was attacked with well-marked spasms, which lasted generally for several minutes.

The injured finger had a very unhealthy and blanched appearance, the bone was united, but the wound, communicating with the bone, was still open; the wound was about a quarter of an inch in diameter, and was situated near the metacarpo-phalangeal joint, the joint itself being considerably thickened.

The wound was quite free from any inflammatory or irritable appearance, yet it was not in a healing condition; the action of the extensor tendon was impaired, and the whole finger seemed shapeless and useless.

As soon as she was admitted (in the evening) she was ordered some brandy and beef tea, half a grain of morphia was injected subcutaneously into her arm, and a linseed poultice applied to the finger. The next morning (Feb. 4th) she expressed herself as feeling much more comfortable, having slept nearly the whole night. At six o'clock p.m. of this day she began to take one grain of the extract of Calabar bean by the mouth every two hours, taking altogether during the night seven grains. This extract was partly dissolved and partly held in suspension, in a little mucilage and water, three grains of the extract being contained in one drachm of the solution. At nine o'clock the next morning (Feb. 5th) half a grain of the extract was injected hypodermically into her thigh; this quantity given by the skin, being considered equal to rather more than one grain by the mouth.

The extract was given every two hours, alternately by the skin and mouth, so that in every four hours one grain and a half were administered, viz., one grain by the mouth and half a grain by the skin. As no immediate effect was produced after this large dose, it was thought safe, and at the same time desirable to increase the quantity given hypodermically; the amount given by the mouth remained stationary, but the alternate doses were each increased by one minim every time they were injected, so that at three o'clock a.m. on Feb. 7th, instead of ten minims (as at first), twenty-three minims, or rather more than a grain, were being injected into the skin. At this hour of the morning she was seized with a severe attack of sickness, profuse sweating, irritation and smarting of the eyes, unattended, however, by contraction of the pupil;

there was still, also, obstinate constipation of the bowels. The twenty-three minims were therefore reduced to twenty minims, and the intervals between each dose increased. As there was no return of the sickness no further reduction was made, but twenty minims were injected hypodermically, alternately with twenty minims taken by the mouth.

On the 8th of February (the day after the attack of sickness) the spasms had very much diminished in intensity, though still occurring as often as before. On this day, at the request of Mr. Southam, I amputated the finger above the metacarpophalangeal joint, as it was perfectly useless, and was possibly keeping up the irritation in the cord. From this day the spasms began to be less frequent; there was still great hardness of the abdominal wall, but there was no return of sickness, nor was there, by any means, complete contraction of the pupil. The spasms ceased on Feb. 11th, and on this day the mouth could be opened to the distance of three-quarters of an inch. The abdominal muscles gradually relaxed; on March 1st all that remained of the disease was a slight rigidity of the jaw, and the sardonic expression in the mouth; both these symptoms had disappeared on March 3rd, when she became an out-patient. The treatment was discontinued on Feb. 13th.

During the attack, the total amount of extract administered was $40\frac{7}{8}$ grains by the skin, and $49\frac{1}{2}$ grains by the mouth, making in all $90\frac{3}{8}$ grains given between Feb. 4th and Feb. 13th. It was owing to the satisfactory results obtained by Dr. Fraser and others, from the administration of this drug in tetanus, that the Calabar bean was used on this occasion.

The wonderful effect which it alone possesses of paralysing the spinal cord, without, at the same time, depressing the action of the heart to any great degree, at once marks it out as likely to be efficacious in tetanus, and the happy issue of this, and several other such cases, will justify a farther trial of its remedial powers in this disease.—*Manchester Med. and Surg. Reports*, Oct. 1870, p. 52.

21.—SEVERE TETANUS FOLLOWING AN INJURY TO AN ULCER ON THE LEG, TREATED BY CHLORAL HYDRATE; RECOVERY.

Under the care of Mr. BIRKETT, at Guy's Hospital.

We lately published notes of two cases of tetanus treated by chloral hydrate, in one of which recovery took place. We have now to add a record of three more, which have been subjected to similar treatment. It is, of course, far too early to draw any definite conclusion as regards the influence of chloral in pro-

moting recovery from this terrible condition, but there would seem to be no doubt of the drug having greatly mitigated the patient's sufferings in the first two of the cases reported. It is only by the comparison of a large number of instances that we can hope to come to a conclusion respecting the merits of the drug, and it is as a contribution towards such a category that the following cases are published.

The first case, which exhibited all the features of severe tetanus, is remarkable, both on account of the exciting cause of the disease, and the relief following the use of the chloral hydrate. It should be observed that when opium was substituted the symptoms became worse, and that the benefit afforded by the chloral, strongly expressed by the sufferer himself, was very striking.

For the report of the case we are indebted to Mr. Branfoot.

R. S., aged 26, a potman, was admitted into Lazarus Ward, on June 28th, 1870. He was well formed, and had enjoyed average good health. He had for some years been suffering from an ulcer of the leg, for which he had been under treatment several times, but which had never entirely healed. Ten days before admission he received a kick upon the ulcer. He took little account of the accident at the time, but seven days after he felt slight stiffness of the jaw, with pain and stiffness in the neck. These symptoms increased in severity, and he was admitted into the hospital three days after the first signs of trismus appeared.

On admission he had an anxious expression of countenance; thick speech; the angles of the mouth slightly drawn down; stiffness of the jaw, and difficulty in deglutition; pulse 108, full. Ordered thirty grains of chloral hydrate every four hours.

June 29th. Angles of mouth much more drawn; pain increased in chest, abdomen, and back; tetanic spasms have set in, and continue at slight intervals; sweats violently; tongue red and swollen; pulse 96; respiration 18.

30th. Continues to get worse. Ordered in place of the chloral one grain of opium pill every three hours; wine and fluid nourishment, as much as he can get down. Ulcer very unhealthy-looking; poultices applied.

July 1st. Is very ill; spasms very severe, coming on about every ten minutes, lasting two or three minutes, and causing him to cry out loudly with pain; pulse 88 between the spasms, during which it goes up to 160; respiration 18, abdominal; pupils slightly contracted.

2nd. Spasms more severe, all the muscles of the trunk affected; slight opisthotonos; jaw fixed; gets fluids down pretty well between the teeth; bowels confined.

4th. Has continued to get worse. Has now taken the opium regularly during four days. The chloral resumed, one drachm being given as a first dose, followed by fifteen grains every two hours.

5th. Is a little improved; slept several hours, off and on, during the night; the spasms are still very severe; is unable to pass any urine naturally.

9th. Has much improved; pulse 86; spasms less frequent, but still very severe; took a little solid food; urine passed naturally; bowels not open. Goes on regularly with the chloral, as he feels the want of it when not kept under its influence.

11th. Spasms have increased in severity; pulse 104 between the spasms; during spasms goes up to 180 and becomes very small; respiration 28, abdominal. Chloral increased to twenty-five grains every two hours.

13th. Pains not so great; is very sleepy and seems very low; does not take nourishment so well; pulse 110, small and compressible; sweats and feels cold.

14th. Chloral decreased again to fifteen grains every two hours; pulse 88, very soft; had four spasms during the night, which were less severe. Missed several doses of chloral, as he slept so much better.

16th. Bowels have been opened by turpentine enema for the first time since admission, having previously resisted all attempts.

20th. Took some solid food to-day. Pain and spasms become more severe when any attempt is made to diminish the doses of chloral.

25th. Improving slowly. Spasms appear now to attack the diaphragm, coming on as sudden catches of the breath, with pain in the epigastric region. Takes plenty of nourishment.

28th. Spasms have left him, but he has severe muscular pains occurring in the back and all over the body; spasms are brought on by movements or exposure to slight draught. The chloral is being gradually diminished.

Aug. 6th. Still has slight jerkings of breath at times; takes food well; greatly improved in health.

8th. Chloral entirely left off. Ordered quinine.

11th. Is gaining strength; gets up every day for two or three hours; ulcer looks healthy and is healing up.—*Lancet*, Sept. 24, 1870, p. 434.

22.—NOTES OF A CASE OF ACUTE TRAUMATIC TETANUS
TREATED BY CHLORAL.

By Dr. ALEX. BALLANTYNE, Dalkeith.

While chloral is upon its trial the following details of this case may not be altogether uninteresting to the profession:—

On May 12th, I was called to see J. S., a healthy, muscular man of sober habits, aged 34. I found him lying on his back, his head bent backward, and sunk deeply in the pillow. He had a well-marked tetanic expression of face, and could open the mouth to the extent of only half an inch. He was sweating very profusely, and his pulse was 112. On moving the bed-clothes for further examination, he had a severe opisthotonic spasm, during which there was great depression of the ensiform cartilage, accompanied by severe pain in the præcordia, and catching of the breath. These spasms recurred at short intervals. After the spasm the abdominal and thoracic muscles remained persistently hard, the back slightly arched, the legs straight, and their muscles rigid. The breathing was shallow and irregular. There was no difficulty in swallowing fluids, and no evidence of laryngeal spasm.

After a prolonged search a small suppurating wound was found at the base of the nail of the left thumb. He stated that a fortnight ago (April 27th) a thorn had run into his thumb, but that he had altogether disregarded the wound, as it had given him no trouble, though he thought the thorn had not been all removed. Further, that on the 9th of May he began to suffer from pain in the neck and stiffness of the jaw. On the 10th he was worse, and took salts and senna, which acted very severely. On the 11th the medicine still continued to act, spasms affecting the whole body occasionally occurred, and he was entirely confined to bed. He said that since the 9th he had slept but little, on account of the pain in the back. A slight incision through the skin was sufficient to expose the portion of thorn left, which was easily withdrawn, and a poultice applied. As he was some distance from town, I left him two fifteen-grain doses of Dover's powder, to be given with an interval of three hours between them.

On the following day (13th) it was found he had passed a sleepless night, and had suffered severely from spasms, recurring at short intervals. Condition generally much the same as yesterday. Pulse 112; temperature 103°; profuse sweating. Determined to give chloral alone in subsequent medical treatment. At 2.30 p.m., one drachm of chloral was given, and in five minutes he was asleep, rigidity of the muscles of the abdomen, thorax, and legs still remaining. Slept without stertor till 7 p.m., when he awoke, took beef-tea with relish, and slept

till 9.30 p.m. At 10 p.m., pulse 100; temperature 99.5° (note the fall). He has no perspiration, and does not complain of pain; muscles still very tense. Gave half a drachm of chloral, which was repeated at 1 a.m. on the 14th, and also at 6 a.m., 10 a.m., and at 12 a.m., making in all three drachms and a half in the twenty-four hours, fluid food being taken freely, sometimes before and sometimes after the medicine.

(To prevent repetition I may say here that fluid food and stimulants were well taken throughout the illness, and had undoubtedly much to do with the favourable issue of the case.)

14th. Noon: Pulse 100; temperature 99° ; no sweating; muscles very rigid; diaphragmatic spasms recur at longer intervals. Since 12 o'clock yesterday has had three drachms of chloral, given in half-drachm doses. At the evening visit the patient lay for the first time on his side, the abdominal and thoracic muscles much less tense, and the legs flexed. Breath exhales chloral; no stertorous breathing; pulse and temperature the same as last visit.

15th. Noon: Pulse 94; temperature 99° . Chloral given as on the 14th. Patient is easily roused. Complains of pain in the muscles of the back and legs. He can open his mouth widely; tongue dry and brown; conjunctiva very red; speaks thickly. Ordered chloral to be given every five hours in half-drachm doses.

16th. Noon: Pulse 90 in sleep; temperature 99° ; general condition of patient the same as yesterday. Aperient medicine given.

17th. Noon: Pulse 90; temperature 98° . Fifteen grains and half a drachm of chloral to be given alternately every four hours, as the muscles are less rigid and the spasms almost gone.

18th. After a second dose of aperient medicine, the bowels were moved freely, without any severe spasms occurring. Pulse in sleep 86; temperature 98.2° . Chloral as before.

On the morning of the 20th, patient progressing favourably. Fifteen-grain and half-drachm doses of chloral continued. In the evening, found patient much worse; pulse intermitting, 130; temperature 98° ; breathing in long deep sighs; surface moist; extremities cold; no spasms. Upon inquiry, found he had been most injudiciously lifted out of bed while the soiled linen was removed. Ordered hot bottles to the feet and sides, stimulants to be freely given (two ounces of brandy every hour), and chloral to be intermitted for a few hours.

21st. Patient much better; pulse 100, regular; temperature 98.5° . Complains much of pain in the back and legs, and suffers from spasm. Chloral as before.

After this date, the patient steadily improved. The chloral was given in varying and gradually decreasing quantities till the 3rd of June, when it was discontinued.

June 6th. Patient quite convalescent; entirely free from hardness of the muscles; takes solid food with ease, and has no discomfort whatever.

Remarks.—This (though the ninth) is the only case of traumatic tetanus I have seen recover. To what extent the chloral had to do with the recovery it is not easy to determine exactly. That it played a most important part as a palliative in the treatment no one will deny. I have chosen to call the case one of *acute* tetanus, because, although nearly a fortnight had elapsed between the reception of the wound and the occurrence of trismus, although the temperature on the fourth day was only 103°, and although the muscles of the larynx and of deglutition were unaffected before the first dose of chloral was given, the extent, frequency, and severity of the spasms, the intensity and length of the diaphragmatic spasm, and the persistent rigidity of the thoracic and abdominal muscles, were as great as in the fatal cases I had seen. The high temperature noted in tetanus—110° Fahr., and over 44°C. (Wunderlich)—is generally observed towards the end of the disease when fatal; and this remark applies frequently also to the spasm of the muscles of the pharynx and larynx, which sometimes remain unaffected for days even in fatal cases, and only subsequently become the seat of spasm. Whether in this instance the use of chloral prevented the spasm spreading to these muscles of course we cannot say, but it is not improbable. In giving the chloral, it was observed that the patient was less rapidly affected by it as the doses were repeated, and that the first dose of one drachm had the most marked effect, reminding one very much of the rapid effect of chloroform in cases of severe and protracted labour, where the patient is much exhausted. The congestion of the conjunctiva was very great during the exhibition of the remedy, and continued for some days after the doses were much lessened.

In all, the patient had six ounces and a quarter of chloral during the three weeks, on an average of two to two and a half drachms per diem. After the 20th the chloral was sometimes intermitted for several hours; but when more than six hours elapsed, the symptoms invariably became more intense, and the patient required a larger dose more frequently repeated during the next eight or twelve hours. Not unfrequently an extra half-drachm of chloral was given in addition to those noted in the report for some specially severe time of suffering.

I have given chloral very frequently, and have found it most useful in whooping-cough, in all varieties of neuralgic pain, in

the insomnia of drunkards, in aggravated hysteria, and in one case of acute mania. In whooping-cough very small doses were enough, from two to five grains. In the insomnia of drunkards, sometimes doses of one drachm required to be repeated.—*Lancet*, June 25, 1870, p. 898.

23.—A CASE OF IDIOPATHIC TETANUS.

For the particulars of this case we are indebted to Mr. Harry Leach, of the Dreadnought Hospital.

Owen T., aged 37, was admitted into the Seamen's Hospital, on the 25th of August, with symptoms of tetanus in a marked form. There was excessive rigidity, the jaws were tightly closed, speech and respiration were difficult, the face suffused, consciousness complete; pulse 102.

The history of the case indicated little. The attack appeared to have commenced, about five days before admission, with general stiffness of the neck, from no apparent cause. This stiffness gradually extended to the jaws, without any other symptoms. There was no trace of a wound or injury of any kind.

A drachm of the chloral hydrate was given every three hours, from 5 p.m. on the 25th to 3 a.m. on the following day, so that half an ounce was taken. This, with small and oft-repeated quantities of milk and beef tea, was swallowed with difficulty, though no relaxation of the jaws took place. About 7 a.m. on the day last quoted very decided and severe spasms, affecting the hands and feet, came on, and elicited loud cries. They recurred at frequent intervals; and, as the pupils were now contracted, the chloral was discontinued for a time, and the patient was brought partially under the influence of chloroform whenever there were indications of a return of the spasms. This resulted in a considerable relaxation of the muscles of the jaws, and a good quantity of fluid food was taken. During the afternoon of the same day the chloral was repeated, and chloroform was frequently given. The patient passed very little urine, had no stool, but took fluid food at intervals of about fifteen minutes, and had a very fair amount of quiet and genuine sleep. At 6.30 chloroform was again administered on account of an unusually severe spasm with screams. He took food well a few minutes subsequently, but died very suddenly twenty minutes after in a severe convulsive fit. No post-mortem examination was made.

The progress of this case was more hopeful than usual; and though, as is commonly the case, the result was unsatisfactory, experiences gleaned in this instance tend to indicate that the

chloral hydrate is worthy of an extended trial, with inhalation of chloroform, whenever the tetanic spasms threaten. No stimulants were given.—*Lancet*, Sept. 24, 1870, p. 435.

24.—CASES OF DELIRIUM TREMENS RAPIDLY CURED BY
HYDRATE OF CHLORAL.

By Dr. J. CORBET FLETCHER, C.M., Tottenham.

Miss E. B., aged 33, showed symptoms of a second attack of delirium tremens on June 12th, the first having occurred last summer. Her rest at night, prior to this date, had been often disturbed by frightful dreams; but on the night of the 12th, she frequently came to her father's bed-room, declaring that the house was on fire, &c. This state continuing on the 13th, I was called to see her on the evening of the 15th. She was not in bed on my arrival, but was running about in her room with her eyes directed to the ceiling, where she declared she saw a variety of visions. The wonderful rapidity with which her hallucinations, and also her attitudes, changed at once, suggested Watson's busy delirium. Pulse 90, weak. Though her face was suffused with perspiration, her skin felt cold and clammy. The tongue was furred; the breath was mawkish, with a vinous odour; her hands trembled, the tongue only slightly. A purgative was given, and a warm bath. Beef tea was ordered to be given regularly; the nursing to be kind, but firm.

Early on the 13th I was called, as her condition was much worse. She had not slept during the night; the visions were wilder than ever; pulse 120. She seemed exhausted and anxious; the lucid intervals were few. She saw ugly animals on my coat and on her bed, and tried to catch them. The bowels had not been opened. Another purgative was given. To secure sleep, she got half-drachm doses of bromide of potassium every hour. At 9 p.m., the excitement and hallucinations had increased: the bromide had no effect. Remembering Dr. Gairdner's suggestion to try hydrate of chloral as a tentative remedy in delirium tremens, and being unwilling to give opium except as a *dernier ressort*, I gave half-drachm doses of hydrate of chloral every two hours until sleep was secured. The first dose was given at 10 p.m. The patient became slightly drowsy soon after its administration, but it did not produce sleep. The second dose was given at 12. In ten minutes she fell into a sleep—light and often disturbed at first, but gradually deeper. At last she slept soundly until 8 a.m.

June 16th. 11 a.m., pulse 76. She felt muscularly tired.

The excitement and hallucinations were all gone. She talked quite sensibly. There was nothing to indicate her former condition except an unsettled stare in her eyes, and slight fidgetiness of manner.

June 17th. To-day she was in her right mind, and enjoyed a walk with her sister. Truly, the effects of chloral in this case were almost miraculous.

Case 2. Mr. N., aged 54, who had frequent attacks of delirium tremens, sent for me June 18th, at 3 a.m. His present attack began thirty-six hours before my arrival. He was in great pain, with cramps in his legs and painful spasms in his abdominal muscles, which caused him frequently to double up as if suffering from slight tetanic emprosthotonos. The hands twitched; the tongue was very shaky; the breath was very disagreeable, with a strong alcoholic odour. He had very marked hiccough. There was no mental alienation. A purgative was given, and half-drachm doses of hydrate of chloral. The first dose was given at 4 a.m. In a short time he fell into a sleep, which was not very sound. After the second dose, at 5.30 a.m., he slept soundly until wakened at 11.30 a.m., when he said he felt ready for beef tea. The muscular twitching was not wholly gone; but the painful spasms and all the worst symptoms of his case had disappeared. After getting some food, he fell soundly asleep again.

On June 19th pulse was 84; he was much better. To secure rest, he had half a drachm of hydrate of chloral the previous night, after which his sleep was unbroken. He had no headache nor other bad symptom attributable to chloral. He took his food well.

On June 20th he was so well that further attendance on him was almost unnecessary.—*British Medical Journal*, July 16, 1870, p. 62.

25.—CHLORAL IN DELIRIUM TREMENS.

Cases under the care of Dr. J. RUSSELL REYNOLDS.

Mr. W. Rigden, Physician's Assistant at University College Hospital, sends the following notes of cases under Dr. Reynolds:—

Case 1.—A clergyman, aged 40, has been a drunkard for years, but worse since his marriage three and a half years ago to a woman beneath him in station, and with whom he does not seem to have got on well. He has been in the habit of taking all kinds of drinks. Has had delirium tremens several times, the last bad attack being a little more than a year ago. Sometimes he has gone for six months without taking any drink.

His father died of paralysis from disease of the brain. The history of insanity is very uncertain.

On May 3rd, 1870, having been pretty steady for six months, he began to drink, brandy especially, and on May 8th he had become so violent that the doctor in attendance placed a keeper over him; he still, however, continued to take some beer and brandy.

May 11th. When he was admitted, the keeper said he had not slept for a week till the night before, when the doctor gave him a dose of a new medicine (probably chloral), and he had seven hours' sleep. He had been very tremulous; taken very little food; very violent at times, especially on seeing his wife.

On admission his tongue was a little coated, slightly tremulous; there was slight tremor of arms; pulse was a little over 100, moderately full. He complained a great deal of his wife, whom he threatened to kill, and of his being detained at the hospital.

He was ordered good diet; 30 grains of chloral at bed-time, and $\frac{1}{2}$ iss of haust. domest. the first thing in the morning. No stimulants.

May 12th. He went to sleep immediately after the chloral, and slept for three hours, when he was awoke by a noise in the ward, and after being awake for an hour the dose was repeated, with the result of sending him to sleep immediately. The house medicine has acted freely. Patient is this morning pure and rational; complains of no headache, only a sense of faintness and weariness; pulse 88, moderately full; appetite very defective.

May 14th. Is quite well; takes his food well; being inclined to be restless at night, he has had the chloral repeated every night. Discharged.

Case 2.—An engine-driver, aged 22, has been given to drink for ten years. Had delirium tremens five months ago, since which he has been drinking as bad as ever. Father says he has not been sober for three weeks. He drinks beer especially. No family proclivity to drink.

Present attack began on May 8th, 1870, with trembling, loss of appetite, great restlessness, delusions of all sorts, occasionally with violence.

Was admitted on May 11th, not having slept since the commencement of the attack; he was very quiet and tractable, easily put to bed. Tongue thinly coated, slightly tremulous, little tremor of his body. Pulse rather weak; ordered good diet. No stimulants.

10 p.m. Has been very quiet, but has not slept. Temp. 99.8° F.; pulse 100.

Ordered chloral hydrate gr. xxx every hour until sleep comes on, and ζ iss of house medicine early in the morning.

May 12th. Chloral was continued every hour till 3 a.m. this morning without producing any sleep. He got more excited, wanting to get out of bed, and slightly delirious.

Chloral was omitted, and bromide of potassium gr. xx every hour ordered. At 6 a.m., not being asleep, gr. $\frac{1}{3}$ of acetate of morphia was given hypodermically, and the bromide of potassium ordered every three hours. He went to sleep at a quarter to nine this morning, and has been sleeping off and on all the morning. His bowels have not acted. Not having passed water since admission, a catheter was passed, and 22 oz. of dark-coloured urine drawn off. Ordered gr. v of calomel.

May 13th. Bowels opened moderately after the calomel; slept well last night, without medicine. Temperature 98.4; pulse 76, rather small and thready. Appetite bad. Ordered—

R. Mag. sulph. ζ j.; tinct. zingiber, Mxxx.; dec. aloes co. ζ j. Fiat haust. st. sumenda.

May 14th. Pulse improved, appetite better; patient still in a very sullen humour. Bromide of potassium omitted, and some ammonia and bark ordered.

May 20th. Discharged.

Case 3.—A gentleman, aged 32, engaged in literary pursuits, having been very much worried, took to drink six months ago, and, according to all accounts, has not been sober nor absolutely drunk for six months. His principal drink has been brandy and wine. His grandfather on the mother's side was a very great drinker, and his mother's brother is in a lunatic asylum through drink.

On May 13th, when admitted into the hospital, he was perfectly rational; said he thought it the best thing for him to come into a hospital; he was very unsteady in his walk, very flushed about the face. There was a good deal of tremor; tongue coated, tremulous; pulse full and strong. To have white of egg and just enough sherry to make it taste, every two hours. Pulv. opii gr. iss at bed-time. and pulv. seidlitz in the morning.

May 15th. Not having gone asleep, and getting more excited, he was given at 1 a.m. gr. $\frac{1}{6}$ of acetate of morphia hypodermically, and at 6 o'clock, gr. $\frac{1}{3}$.

5 p.m. Has not slept; is very excited. Bowels have not acted; has been sick after everything he has taken all day. Ordered—

R. Ol. terebinth. ζ ss.; mist. acaciæ ζ j.; dec. hordei diss. Fiat enema statim ad min.

Et R. Pot. bromidi \varnothing j.; sp. æth. nitrici ζ ss.; mist. camph. ζ ij. Fiat haust. 6tâ quaque horâ sumend.

10 p.m. Morph. acetes gr. $\frac{1}{2}$ hypodermically.

May 15th, 1 a.m. Rep. morph. gr. $\frac{1}{3}$.

Bowels freely opened after enema; vomiting not so severe. All last night was very delirious, fancying all sorts of horrible things were going to happen to him. To have beef tea alternating with the egg; to have a little brandy instead of the sherry, but not more than 3 vj in the twenty-four hours—only for a taste.

9 p.m. Rep. hypoderm. gr. $\frac{2}{3}$.

May 16th. 4 a.m. Rep. hypoderm. gr. $\frac{1}{4}$.

9 p.m. Has not slept at all; was more excited than ever last night. Pupils just a little smaller than natural. Sweats profusely; takes his food well. Pulse not so strong as formerly, but still very good.

5 p.m. R. Chloral hydrat. gr. lx.; tinct. aurantii 3 j.; aq. puræ \mathfrak{z} j. St.

17th. Patient went into a light sleep ten minutes after taking the chloral, and continued sleeping, waking up at intervals of a few minutes for nourishment, till midday to-day, when he was very much better; not quite rational. He was then ordered—

R. Mag. sulph. 3 ij.; tinct. zingiberis \mathfrak{M} xxx.; tinct. card. co. \mathfrak{M} xx.; dec. aloes co. \mathfrak{z} j. Statim.

18th. Perfectly rational; slept well last night. Bowels open freely. Feels very hungry; brandy stopped; meat ordered. Has only a little pain over brow.

21st. Has slept and taken his food well; pain quite gone; has been taking the bromide of potassium, but no more chloral or morphia. Discharged.—*Practitioner*, Aug. 1870, p. 124.

26.—DIGITALIS IN DELIRIUM TREMENS:

FIVE CASES SUCCESSFULLY TREATED BY HALF-OUNCE DOSES OF THE TINCTURE; WITH REMARKS.

By Dr. ALFRED WILTSHIRE, Junior Physician to the West London Hospital; Physician to the Samaritan and the British Lying-in Hospitals.

The *Lancet* of June 4th contains an account of a case of delirium tremens successfully treated by large doses of digitalis. The publication of that case, together with those recently published by my friend Mr. Nankivell, has induced me to recount my experience of the drug in similar instances. I may premise that four of my patients had one dose only; but that, it is right to add, consisted of half an ounce of the tincture of the London Pharmacopœia. The other patient had, first half an ounce, and then, after the lapse of some hours, two drachms.

Case 1. — The first case treated with what may be regarded as an heroic dose was that of a woman, aged about 40, who was engaged in the kitchen of a large institution where she had ample opportunity of obtaining stimulants. When she first became delirious, a full dose of opium was given by the surgeon in attendance, and was repeated some three or four times. In spite of this, however, she became so excited that it was thought desirable to send her to the insane ward, where, shortly after her admission, two drachms of tincture of opium were administered. No improvement followed the exhibition of this large dose, and the gentleman in attendance gave up all hope of saving his patient. At my suggestion, half an ounce of tincture of digitalis was administered. I watched the effect of this, and observed that twenty minutes after its exhibition the patient fell asleep. She slept for several hours consecutively. On awaking, as she was still somewhat delirious, though much less excited, I thought it desirable to give her two drachms more of the tincture. After this no further treatment was required, and the woman quickly resumed her duties.

Case 2.—The next case that came under my notice was that of a potman, aged 35, whose symptoms for the first two days of the attack were so like those of enteric fever that it was not without some difficulty that I made a correct diagnosis. Parenthetically I may observe that, probably, had the clinical thermometer then been in use, the difficulty I experienced would not have arisen. Moderate doses of opium did no good, nor did like doses of tincture of digitalis. The patient became so much worse that I determined upon giving him half an ounce of tincture of digitalis. My notes state that “he was asleep within ten minutes of taking the dose; slept for four hours: then was awake for half an hour; and then slept again for two hours, making six in all.” This was the first sleep he had had for nearly a week. He was well in a day or two.

Case 3.—The subject of this case was a grocer aged about 26, who, having inherited a considerable sum of money, was unwise enough to indulge in repeated debauches of a serious character. I learned from his wife that he had previously had at least one severe attack of delirium tremens. When I saw this patient he was in a state of high delirium and very troublesome. I need not detail the treatment adopted; suffice it to say that, in spite of opium, antimony, henbane, oxide of zinc, cannabis indica, &c., he did not improve; indeed his condition became really alarming. Half an ounce of tincture of digitalis now appeared to me to be the only remedy likely to benefit the patient, and accordingly I gave him that dose. I should here state that up to the moment of giving the tincture the pulse was rapid and of an irritable character. The heart seemed to me to beat much

too often and to do but little real work; and this I believe was actually the case, for in a very few minutes after administering the drug I noticed that, whilst the pulse, which I closely watched, had fallen in frequency, it had increased considerably in volume, and this at the time to me somewhat alarming change was exactly coincident with the supervention of sleep, which occurred in less than twenty minutes after the exhibition of the remedy. This one dose cured the patient of that attack, and for some time he remained well and temperate. At last, however, he again broke out, and I attended him once more in a similar attack, which will be detailed under the heading of Case 5, as I prefer to relate the cases in the order in which they occurred.

Case 4.—In this instance, the patient, a young gentleman aged 21, who had forfeited an excellent Government appointment through drunkenness, was furiously delirious. Neither opium nor morphia had any good effect upon him, and it was only after their failure that I ventured upon giving a large dose of digitalis. In this case, as in the last, I closely watched the effect of the drug upon the pulse, and with precisely similar results: it fell in frequency, while it gained in force and volume. The patient was asleep within a quarter of an hour of taking the medicine, slept for ten hours consecutively, and on awaking felt and remained perfectly well. This patient died a year afterwards of phthisis, induced undoubtedly by drink and debauchery.

Case 5.—This case occurred in the person of Case 3, and is peculiarly interesting on the following account:—

Dr. Russell Reynolds, whom I had acquainted with the success I had met with in the foregoing cases, suggested that possibly the good effect of the half-ounce of tincture of digitalis might be owing to the alcohol it contained, and not to the digitalis; and he recommended that, if I had an opportunity of doing so, it would be well to try the effect of half an ounce of proof spirit. Dr. Reynolds, also, suggested that, if I found it necessary to resort to digitalis, it would be desirable to give a watery infusion of the drug, using a dose of it equal in strength to half an ounce of the tincture. It so happened that, shortly after this conversation, Case 3 again came under my care, with another severe attack of delirium tremens. I felt it to be my duty to give him the benefit of ordinary treatment at the outset, as I had done in the first attack for which I attended him; but the result was equally unsatisfactory, and, ultimately, I judged it to be necessary to give him digitalis again. But before doing so I determined to put into practice Dr. Reynolds's suggestion. I accordingly gave half an ounce of proof spirit; and although for a considerable time I carefully watched the patient after its administration, I could detect no change what-

ever either in the pulse, respiration, or mental condition. Finding the result of this experiment to be purely negative, I resorted to the half-ounce dose of tincture of digitalis, as I found a difficulty in procuring good digitalis leaves wherewith to make a watery infusion. This, happily, acted as efficiently as a like dose had done on the first occasion; and the phenomena observed after its administration were of precisely the same character—that is to say, the pulse fell in frequency while it gained in volume and strength, the breathing became more tranquil, and the patient fell asleep within twenty minutes of taking the drug. After some hours' sleep he awoke cured.

Remarks.—No bad or dangerous effects were observed in either of the cases narrated, although, I confess, that the marked decrease in the frequency of the pulse at first made me uneasy; and, had I not recognised that, while it fell in frequency, it gained remarkably both in force and in volume, I should have been alarmed.

It will be observed that my patients were young, or comparatively young, persons; for I am averse to treating the aged by means of large doses of digitalis, being, in truth, as it were instinctively, afraid to do so. And, even in the young, I was and still am loth to resort to so powerful, not to say dangerous, a remedy without, in the first instance, having given the patient the benefit of what is regarded as more orthodox treatment, which, undoubtedly, succeeds in the majority of cases. In endeavouring to analyse the reasons which influenced me in giving these large doses to young, or comparatively young, patients (for age should not be measured by years alone), and withholding them from others, I made out the process of reasoning to be somewhat as follows; and I venture, although with some diffidence, to mention it, because I believe it to have served me in good stead.

There is unquestionably a great disturbance of the vascular system in delirium tremens. Whether arterial tension be lessened or increased need not now be discussed: this much we may safely assume, that there is a considerable departure from the normal standard, and as long as that departure is maintained there is delirium. It is well known that digitalis exerts a very powerful influence over the heart and the whole vascular system. Its precise *modus operandi* is perhaps beside the object of this paper, but I cannot forbear remarking that probably the following explanation is very near the truth. It is admitted on all hands that digitalis retards the action of the heart, and by most observers that it materially increases the tone of that organ. Now, retardation of the heart's contractions gives more time for the auricles to unload themselves into the ventricles, and in this way venous stasis may be lessened; while, from the in-

creased force with which the ventricles, especially the left, contract, the arterial and capillary circulation may be improved. But, whatever may be the condition of the vascular system in a given case of delirium tremens at the moment of exhibiting a large dose of digitalis, it is thereby altered. It is this sudden alteration which I think unquestionably takes place that, in my judgment, makes large doses of digitalis dangerous; for whether arterial tension be increased or diminished, the alteration is so sudden that unless the vessels be sound and elastic they cannot quickly enough accommodate themselves to the change, and hence, I believe, the danger. It is clear that those persons whose arteries have become inelastic from degeneration cannot safely bear sudden changes in the tension of their vascular system; and, *à fortiori*, those in whom this degeneration (or "rottenness," as Sir Wm. Jenner aptly expresses it) has gone on to any great extent are in the greater danger, and that for two reasons—first, because the rotten spots may give way if the tension be suddenly increased; and secondly, because the rigid arterial tubes cannot contract upon, and accommodate themselves to, the lessened volume of blood if it be suddenly diminished. This, I believe, will explain why *large* doses of digitalis are so dangerous to the aged. *Small* doses, I need hardly say, are invaluable in the treatment of the cardiac affections of old people; and it may be that their cautious use may prove beneficial in the treatment of delirium tremens occurring in persons of advanced years.—*Lancet*, Aug. 27, 1870, p. 286.

27.—ON THE NATURE OF THE CONDITION CALLED EPILEPSY.

By Dr. J. THOMPSON DICKSON, M.A., Medical Superintendent
of St. Luke's Hospital.

[A great deal has been written upon this interesting subject, and much has been firmly established. The first real step in advancing our knowledge of the subject was made by Schroeder van der Kolk, whose researches were followed by those of Brown-Séquard.]

The following are the ideas which it is my intention to attempt to establish :—

1. Epilepsy is a contraction of the cerebral capillaries and small arterial vessels; the order of its stages in an epileptic attack being, irritation of brain, either direct or secondary to exhaustion; contraction of cerebral capillaries and small arterial vessels; cerebral anæmia, and consequent loss of consciousness.

2. The muscular contraction and spasm, together with all the varying phenomena associated with epilepsy, are altogether secondary, and not at all essential or constant, but they are all manifestations of imperfect nervous (cerebral) control, or a loss of balance between the nervous and other systems.

It is perhaps unnecessary to prove loss of consciousness as the first subjective phenomenon of epilepsy, since it is on all hands admitted; or, as stated by Trousseau, it may be considered the pathognomonic sign of epilepsy. To whichever variety of the two great specific forms—*le petit mal* and *le haut mal*—any individual seizure may belong, we can always, by strict inquiry, find some amount of unconsciousness in the first stage. The absolute fixedness of this rule—which may almost be called a law of epilepsy—has been doubted, I know, by few. I shall endeavour to meet their objections further on in this paper.

The condition of anæmia is, strange to say, the one which was long unobserved; and, in fact, only within the last few years has it been noticed at all. The congested state of the vessels of the face and neck attendant upon epilepsy is secondary; but so much more striking is it, that for long it was the only condition of vascularity observed. The pallor of epilepsy is sometimes of considerable duration; but this is more particularly the case in *le petit mal*, the almost endless varieties of which were not until lately recognised as epileptic, and, consequently, as they were considered as fainting attacks, the attendant pallor made no impression on observers: usually, however—especially in *le grand mal*—it is fleeting. The fact of pallor, however, is an indication, though not a certain evidence, of cerebral anæmia. It would appear highly probable that the face and neck sympathise with the internal condition of the skull as regards sanguiference; but further evidence is necessary, since, on simple principles of animal mechanics, if one set of vessels be empty another set must be more or less full; and the question might reasonably be asked, why the surface-vessels of the head should not be the ones to take up the opposite condition to that of the cerebral. The question would, however, be specious, since it is the venous rather than the arterial vessels that receive the blood; but this is not altogether absolute. The best evidence that the surface-vessels correspond with those of the cerebral is, that consciousness is lost during the anæmic state, while, in conditions presumably congestive, *e.g.*, the paroxysm of whooping-cough, consciousness never, in the true sense of the expression, disappears.

Animals that have died or being killed during a fit, have always exhibited brains perfectly anæmic, blanched, and bloodless. This is borne witness to by Schroeder van der Kolk, Trousseau, and Brown-Séquard, and has obtained in all my own experiments and observations.

3. Whenever cerebral anæmia is by any means brought about, loss of consciousness is the result; *e.g.*, if pressure be made upon the brain or cerebral membranes of an animal, or if the brain be wounded, anæmia and loss of consciousness instantly result. In the case of an infant among the out-patients of Guy's Hospital, said to be epileptic, I made simple pressure with my finger upon an open fontanel, and produced the whole of the epileptic phenomena perfectly. An animal bled to death passes through all the stages of epilepsy before the final struggle. It is hardly necessary to multiply the evidence on this point. It is essential, however, to demonstrate the fact of the contraction of the capillaries and small arterial vessels as a result of irritation or exhaustion, as it is to this contraction that the anæmia and loss of consciousness are due.

Direct irritation, such as that already mentioned, *viz.*, pressure on the membranes or a wound of the brain, are always followed by instantaneous contraction of the smaller cerebral vessels; but, at the same time, the capillaries of the medulla oblongata become distended. This point is one particularly worthy of notice, and was first observed by Schroeder van der Kolk. If an animal be trephined, and a knife plunged into his cerebrum, the whole of that organ will become instantly anæmic, and its small vessels will be found contracted, while those of the medulla—particularly the capillaries—will be found full and distended. It is well to try this experiment on an animal, the subject of epilepsy, as the constant recurrence of the seizures permanently dilates the capillaries of the medulla. It must not be assumed from this that the blood from the cerebral vessels passes to the medulla. It is more likely that, on account of the sudden check to the circulation of blood in the cerebrum, the cumulative force of the arterial current endeavours to expend itself in the nearest channels, of which the medulla forms one; and the absence of resistance, owing to the yielding nature of its material, readily allows the dilatation, which continuously increases the longer the epilepsy is continued.

It thus is clear that, in the relations of cause and effect, the dilatation of the capillaries must be included under the latter head, and must be considered as altogether secondary to the epilepsy.

As the actual pathological lesions associated with epilepsy, I may enumerate tumours involving surface, surface-abscess, tuberculous membranes, thickened membranes, adherent membranes, and atrophy, to which I may add, as a rare though occasional condition, surface-softening, and perhaps softening of the cord. This synopsis is from an examination of the daily records of *post mortem* examinations at Guy's Hospital, extending over ten years; and to it I will add bony tumours projecting

from the inner table of the skull and encroaching upon the surface of the brain ; also ossific membranes.

Extensive disease may occur in the centre of the brain ; but unless the surface be involved, the central pathology will not be associated with epilepsy as a concomitant.

The histories of clinical cases give unequivocal evidences of tumour and syphiloma, thickening of the cerebral membranes from alcoholism and blows, and hereditary transmission of both syphilis and nervous imperfection ; while fright has sometimes been set down as a cause. It occasionally happens, however, that the physician will be baffled in every attempt to find out the particular predisposing cause in an individual.

I have already observed that any cause which tends to produce an anæmic condition of the brain is sufficient to induce convulsion, exemplified in the sudden and direct depletion, as when an animal is bled to death : a more gradual drain, however, will produce the same result. For instance, menorrhagia may stand in the relation of cause to effect ; also watery conditions of the blood, as in albuminuria, whether of morbus Brightii or of parturient women. Again, excess of urea, as well as poisons directly introduced into the blood, as atropine, narcotine, nicotine, will also stand in the same relation. Another and not uncommon cause is distant local hyperæmia, exemplified especially in children who suffer from convulsive disease, as an affection secondary to disturbance of the digestive organs and the irritation of worms ; exemplified also in the dentition of infancy ; but in this latter case, as perhaps also in a minor degree in the former, the element of peripheral irritation must be somewhat taken into account. Irritation of the peripheral extremity of a nerve will produce epilepsy. A remarkable case was quoted by Dr. Brown-Séquard (reported by the late Mr. Standist, of Taunton) ; and I have seen more than one case of epilepsy traceable to carious teeth. The constant irritation of the extremity of a nerve exhausts the potential energy of the cells from which the nerve takes its rise, and produces a condition very similar to shock, whether physical or psychical. All forms of shock appear undoubtedly to determine the occurrence of epilepsy in some individuals ; yet, with regard to the psychical variety, I would speak very guardedly. One case under my observation for some time was attributed to fright ! A *post mortem* examination exhibited a surface-tumour. Another patient, the widow of an officer who was murdered before her eyes in the Indian mutiny, stated that she had been epileptic ever since the fright she received on that heart-rending occasion. She had, however, suffered from that time up to the time I saw her more or less from menorrhagia. The epilepsy was always increased when the flux was augmented, and lessened

when it abated. After a short treatment, directed towards the control of the menstrual discharge, the epilepsy ceased to recur. and she has remained free from the attack ever since.

Dr. Brown-Séguard, in the commencement of 1869, stated to the French Academy that, in continuation of his experiments in inducing epilepsy by section of the spinal cord, he had concluded that the greater part of the cord takes an active part in the production of convulsion, because he had seen attacks occur in the muscles innervated by a segment of the cord comprised between two sections. The fact, as stated by Dr. Brown-Séguard, has, however, very little real bearing on the subject of epilepsy, except to confirm the truth of the hypothesis that the convulsive movements of epilepsy are the result of loss of control.

Dr. Brown-Séguard further stated that the brain seemed to take no part in the convulsion, because convulsive seizures continued to be produced in epileptic guinea-pigs, in which life was maintained by artificial respiration after the brain had been removed. This fact at least tends to confirm the idea I proposed at the commencement of this paper, viz., that convulsive movement in epilepsy is the result of a loss of cerebral control, or loss of balance of control between the cerebral and other systems. An animal with a bloodless brain—the effect either of direct depletion or of irritation from any cause—is in very much the same condition as an animal without a brain at all; and, therefore, there is not that discordance between clinical observation and the results of the experiments of Dr. Brown-Séguard which MM. Colin, Ricord, and Hardy, attempted to show, when Dr. Brown-Séguard's paper was discussed. Dr. Brown-Séguard stated that he had never been able to produce epilepsy by unilateral division of the cord in any animal other than the guinea-pig, except the cat. It is a fact worthy of record that I have induced epilepsy in the rabbit by unilateral section; I have also seen one case of epilepsy in a wild rabbit.—*British Medical Journal*, June 4, 1870, p. 568.

28.—A CASE OF HYSTERIA ; “TEMPER-DISEASE,”
HYSTERICAL (?) CONGESTION OF THE LUNGS, AND
PERSISTENT VOMITING.

By Dr. JOHN W. OGLE, Physician to St. George's Hospital.

Amongst the various puzzling and anomalous symptoms presented by those who are the unhappy subjects of that condition which we term the hysterical one—“the most profitable and safe of diseases in the catalogue of the ills that flesh is heir to”—none are more difficult to contend with, none more apt to

give trouble in diagnosis, than those which the insight of Dr. Marshall Hall included under the designation of "temper-disease." In this form of ailment, the mental disposition or temper becomes perverted; there is disturbed equilibrium of the naturally well balanced moral faculties. As that writer observes, "its object is frequently to excite and to maintain a state of active sympathy and attention, for which there is, as it were, a perpetual morbid and jealous thirst. It was," he observes, "rather aptly designated by the clever relative of one patient an ego-mania. One patient cannot articulate; another cannot walk; a third cannot eat, cannot swallow, or, if deglutition have been performed, does not retain the food on the stomach, but, without nausea, and apparently without effort, returns it; as it were, by an act of easy rumination." He relates instances in which spasmodic action of the muscles of different parts persisted for several hours, keeping attendants on the watch all night; instances of ptosis and various forms of paralysis of limbs, of dysphagia, of inability to write properly, inability to retain or pass the fæces or urine; examples of abdominal tumour, &c.—all occurring in connexion with the "temper-disease"; and observes that, though these cases occur chiefly in young females, yet males, and in some instances children, may be the subjects. I propose, in the present lecture, to bring before your notice a case which lately occurred in the hospital, and which some of you may have watched, in which, from sheer obstinacy, the patient refused food to a considerable extent, in illustration of this temper-disease. But please to bear in mind that this affection obviously is not (again to quote Dr. M. Hall) altogether a feigned disease, but a perversity, an insaniola, originating in bodily disorder or mental affection, and perpetuated by a morbid indulgence of temper and desire for sympathy and attention.

Sarah G., aged 20, rather delicate and interesting looking, was admitted into Crayle Ward, St. George's Hospital, October 6th, 1869. According to her statement, she had been ill for twelve months with "cold and cough", attended during almost the whole of that period by vomiting, which had been pretty constant. Until four months before admission, it was affirmed that *the catamenia had never appeared*. It was also stated by herself that she had been an in-patient at Christmas, 1868, at St. Mary's Hospital, and also in University College Hospital in June, 1869, where she had been treated for pain at the lower part of the left side of the abdomen, and for vomiting, which came on directly after eating food. At that time she was blistered. The above information was elicited from herself. Upon inquiry, I could not find out anything about her having been at University College Hospital; but Dr. Cheadle told me that

she had been under Dr. Handfield Jones's care at St. Mary's; and that, according to the Registrar's account, the case was entered as "bronchial catarrh and deficient menstruation. It is stated that she had been ill three months, with cough and vomiting, having previously been in good health; and that, whilst in the Hospital, she complained of pain in the left side, worse after eating and at night. Dry wheezing inspiration was heard to the right of the left nipple; otherwise the breathing was good all over. She was troubled with night-sweats and headache. The pulse was 96; urine of specific gravity 1015, and free from albumen.

Upon admission into St. George's Hospital, the face was much flushed, the tongue yellow and coated, and the bowels confined. Vomiting was persistent, and the ejected food sometimes blood-stained. The abdomen proved to be much distended, but not hard, forming a palpable smooth swelling. Great pain, and tenderness on the slightest pressure, were apparently felt at the pit of the stomach, and in every part of the abdomen or chest. Subjective pain at the lower part of the left side of the thorax was also complained of, increased on deep inspiration and there was cough in the morning, accompanied by brown viscid expectoration, at times containing blood-streaks. On physical examination, dulness on percussion was discovered at the base of the left lung behind, and coarsish respiratory murmur at the apex of the right lung in front. The catamenia had appeared three weeks before admission. No vaginal discharge was complained of; and no local pain or morbid sensibility, &c., existed, which could be referred to the uterus or ovaries. The pulse was soft and weak, and quiet; and the axillary temperature 98.5° . Her manner was somewhat sly and hysterical. She was fed with beef-tea, and milk with lime-water; and constipation was met by blue pill and the compound extract of colocynth, and subsequently by senna draught. The infusion of calumba, with compound spirit of ammonia and bicarbonate of potass, was given twice a day.

On the 9th, she was much the same, vomiting all food and medicine. The pulse was very feeble, and 100 per minute; and the respirations 24 per minute. Calomel and senna were given; and later on, as no effect resulted, scammony and calomel and castor-oil enema were administered. Afterwards, calomel and jalapine, and then enemata with sulphate of magnesia and confection of rue, were resorted to. On the 13th, the urine was found to be very albuminous; the tongue coated; and the vomiting worse, the vomited matter being occasionally streaked with bright-red blood, as if it came from the pharynx. The patient was very low and feeble. To ease pain and vomiting, I prescribed a draught to be taken every three hours, containing

a quarter of a grain of extract of belladonna, and one drop of hydrocyanic acid, with syrup of ginger; and allowed fragments of ice to suck, Three ounces of brandy with water were ordered in twenty-four hours. On the 16th, the pain had continued very great in the hypogastrium; and the urine, which was very scanty, contained blood corpuscles, but no "casts" of uriniferous tubes. Hydrocyanic acid in three-drop doses was given in effervescing draught; and line-water, and calomel, and jalapine, and subsequently croton-oil, as aperients; and, as but little ease followed, I ordered to the epigastrium a blister, of the size of a five-shilling piece. On the next day (the 20th), the urine was found still to contain albumen, but to be acid, and was "smoky" in colour. The face was flushed; and the pulse 84, and small. Still she had a cheerful appearance, and from the first no positive emaciation had been apparently produced. The day following, the blister was dressed with a quarter of a grain of meconate of morphia. Subsequently, one-fifth of a grain of morphia was injected subcutaneously in the arm, much pain being complained of along the œsophagus. On the 23rd, a drachm of saccharated solution of lime was given in peppermint-water every two or three hours; and a quarter of a grain of morphia, with one-sixtieth of a grain of atropine, injected subcutaneously; and on this day the urine was found free from albumen, which was looked for, but was never found in it again. Morphia was again injected subcutaneously, and beef-tea and milk were given as enemata, as she refused to take any nourishment by the mouth. Belladonna liniment was rubbed over the abdomen; but she indignantly refused to have this used, and also resisted the enemata. On the 27th, the respiration was 36 per minute; the pulse 84; and the axillary temperature 98.2° . Want of sleep was greatly complained of, and attempts to meet this were made by repeating from time to time the morphia injections. The patient greatly disturbed her neighbours in the ward by much noise, groaning, &c.; becoming irritable and angry, if checked or thwarted. The pain and vomiting and constipation went on in spite of treatment; and her condition was looked upon as that termed hysterical, all physical indications of disease in the lungs having entirely cleared off. Dyspnœa was, however, still complained of. The epigastrium was again blistered, and morphia applied, and the foetid spirits of ammonia given. On December 6th, whilst the girl was apparently suffering in the same manner, the Queen passed the hospital, on her way to open Blackfriars Bridge; she rose in bed to watch her out of the window, having been thought utterly unable to move, owing to pain. Whatever doubts one had previously entertained were now more or less removed; and I at once ordered her to be

dressed, and to lie outside the bed. Dr. Pitman, as one of our Consulting Physicians, saw the patient with me, and agreed with me respecting the case. She still refused food, or vomited what was given to her. On the 25th, a letter was picked up on the floor, in the girl's handwriting, addressed to another patient in the same ward, and begging for food to be brought to her; and about this letter she greatly prevaricated. The epistle, a curious one, with the original spelling, is given in a foot note. She continued to abstain from food offered to her, and lay groaning and moaning; being very impertinent, or as the nurse said, "saucy," to those around her. On the 31st, she passed a *healthy and ample evacuation* by the bowels; and this was observed on several occasions by the nurse. Subsequently, the noise she made was so disturbing, that she had to be moved into a separate room, and to have a nurse provided who should carefully watch her. She then took food such as arrowroot better. I also at that time for some days prohibited friends coming to visit her. The bowels were kept open by senna and oil enemata; and the hydrate of chloral was given in thirty-grain doses, with good effect at night on several occasions. One day, friends having been again admitted, I found the girl sitting up in bed, trying on a new coloured frock. Valerian and ammonia, with aloës, &c., were given; and shower-baths for a week, on alternate days. She was also faradized along the back and limbs from time to time by Mr. Laking.

The baths were again omitted, owing to the appearance of the catamenia. As she became much quieter, she was allowed to return to the wards upstairs, but not to be same ward in which she was previously, as she had contracted a dislike to the nurse, who may have been a little impatient with her; and by degrees she was compelled to walk about, being repeatedly led into the middle of the room by herself, and left there to find her way back to her bed. She entirely ceased to complain of pain and to vomit; and gradually she ate ordinary food. I then ordered her to resume the shower-baths; but she so resisted this, that, upon my determining she should have them, she one day walked out of the hospital, and left it altogether. We have made inquiries about her since; and she wrote to Mr. Laking, saying that she only suffered from pain in her left side, and at times in the head; and that she would like to come up and see her friends at the hospital: at the same time expressing great regret at having "gone on so as she did."

Such is the case which I wish to bring before your notice; and you will recognise in it a good example of that perversity of will, that determination not to adopt means for recovery, and obstinate desire to be considered an invalid, which may be termed "temper-disease," associated with, and complicating, so

to say, symptoms of a graver character. The aspect and mien of the patient, the history of her previous symptoms, the constipation, tympanitis, the exquisite morbid impressionability, the deficient catamenia, and the constant vomiting without any ascertainable cause for it, and this vomiting *unaccompanied by nausea*, in addition to the fact of the *temperature* being always found to be *natural*, conspired to mark the case as one embracing, at any rate, much of the hysterical element. The forgetfulness of all her ailments on the occasion of the Queen passing the hospital and the affair of the new dress, and the result of treatment also, evidently bore out this view. At the same time, the cough, the expectoration (considering its character), and the physical signs met with on examination of the lungs, indicated that we had something more than ordinary hysterical symptoms to deal with, which probably had long been going on.

Possibly the history of the case may have been as follows. The girl, being by nature self-willed, with a "naughty" disposition, badly trained, too well pleased to attract and receive attention, of an hysterical temperament, and of a weakly physical frame, may have "caught cold," which produced catarrh and some pulmonary congestion. This state, under the injudicious and capricious care of attendants, with the above antecedents, may have originated that exaggeration of self-consciousness which developed into the condition spoken of as "temper-disease," accompanied by other symptoms of an hysterical character. [I have adverted to the character of the vomiting, alluding to the fact that it was not accompanied by nausea. This I would have you take notice of, as probably, when it is doubtful how much is hysterical in a given case, the absence of nausea may aid you in arriving at a right judgment.]

At the same time, although other symptoms drew our attention to the condition of the lungs, and made us careful in not overlooking any serious mischief that might exist, you will observe that, regarding the characters of the temperature of the body and other circumstances, I did not lay too much stress (in the illness) upon the lung-symptoms, as being distinct from the general condition. I could not help reflecting that, after all, the lung-trouble might be part and parcel of the general hysterical condition—one of its manifestations. We know well that affections of the pharynx and larynx, attended by cough, exaggerated secretion—in some cases, discharge of blood and local hyperæsthesia—may attend the hysteric state. I think there is no doubt that irritative symptoms of the respiratory organs of a character allied to the hysteric have before now

been mistaken for indications of phthisis, and treated accordingly. We have proof that in this condition we may not only have pain more generally diffused, but also concentrated, as it were, in isolated parts; and, in addition, local redness, heat, and swelling, and all appearances so often presented in inflammation. I could adduce a multitude of instances; but here, at St. George's Hospital, it will at the moment suffice to remind you of those observations of Sir Benjamin Brodie (with whose works, as St. George's men, you ought to be especially conversant) regarding certain hysterical affections. For example, you will call to your recollection those highly interesting cases of the results of nerve-irritation which he adduced. In one case, pain and inflammation in the testicle were caused by a calculus in the ureter; in another, effusion of serum took place into parts supplied by the trifacial nerve in cases of *tic douloureux*; in another, pain, redness, and tumefaction of the toes came on, as a result of neuralgia, alternating with neuralgia of the face; in another, local pain and inflammation attended neuralgia, and were amenable to the action of quinine; in another case, local pain and swelling, supposed to be of scrofulous character, in reality were referable to hysteria, and conjoined with hysterical attacks. He also mentions painful swelling of the skin, like aggravated urticaria, arising under hysteric influence. You may all remember cases of hysterical knees, mimicking organic alterations in those parts. Possibly you may have yourselves seen cases of the swelling of inguinal glands from irritation of the urethra. All such instances show that, under certain nerve-influences operating from a distance, we may have great vascular, nervous, and other disturbance in individual parts of the body, simulating ordinary inflammation; so that it must not be considered far-fetched if we suppose that, under certain conditions of the nervous system occurring in hysterical people, we may have such interference with circulation, secretion, and nutrition in the substance of the lungs, as in other parts of the body, as shall give rise to cough, expectoration, pulmonary crepitation, and a condition in which there is dulness on percussion over the chest. And, if so, may we not entertain the supposition that in the case before us we have an instance of the kind; the more so, as the whole of these symptoms gradually cleared off?

What Dr. Billing states of hysteria in general is especially applicable to instances of "temper-disease." He observes of it, "There is no disease which requires so much *discrimination*, *skill*, and *patience*, as obstinate hysteria, unless it be that with which it has been too often confounded—*insanity*."—*British Medical Journal*, July 16, 1870, p. 57.

29.—EFFECTS OF CHLORAL WHEN EXHIBITED IN A CONTINUOUS MANNER IN ACUTE AND CHRONIC NERVOUS DISORDERS.

By Dr. WILLIAM STRANGE, Physician to the General Hospital, Worcester.

Case 1.—Congestion of Brain from Solar Heat.—A young lady, aged 24, whilst on a visit to Ireland, after exposure to intense solar heat, had active congestion of the brain and its meninges, characterised by severe pain and heat at vertex, hot burning skin, quick pulse, vomiting, and total insomnia. These symptoms were treated by an Irish physician, by means of leeching, shaving, and blistering the scalp, mercurials, &c., with abatement of the urgent symptoms. The insomnia, however, remained, with total loss of appetite, and much depression. The muscular weakness was extreme. I recommended, from a distance, that the chloral should be tried, but it was not approved of by the gentleman in charge of the case, who had had no experience of the drug. It was attempted to subdue the sleeplessness, &c., by means of opiates, which failed entirely, their only effect being to derange the digestive organs still more. On the patient coming under my charge, the chloral was given at once, with the best effects. The pulse ranged at this time between 110 and 120, feeble, sharp, and quick. There was still heat at the vertex, although the skin had become cool and the tongue clean. She had also that quickness and sharpness of both the mental and physical motions characteristic of this affection, and no sleep. Twenty-five grains of the hydrate were given at bed-time, with the effect of producing a good night from the very first dose. When the chloral was omitted, that night was invariably a sleepless one. It was therefore continued for some time, and although the excitability did not give way at once, the pulse remaining sharp, at from 110 to 118, the appetite grew ravenous, the digestion being correspondingly rapid; the tongue remained clean all the time, whilst under the morphia it had been foul, and the appetite *nil*. Small doses of quinine with the bromide of potassium were now added, and the patient rapidly progressed to a good recovery.

Case 2.—Concussion of Spine in a Railway Carriage.—A tradesman, aged about 35, travelled from Rugby to London in a train which does not stop during the whole of that distance. From some defect in the coupling or the springs of the carriage, the passengers in it were shook and tossed to-and-fro, so that they were unable to retain their seats, and some of them stood the whole way to town, holding on by straps or woodwork to support themselves. This shaking up was followed in my patient within a few hours by partial insensibility and loss of

memory, and, after a few days, with feverishness, numbness, and tenderness in the lower extremities, thickness of speech, inability to find the right word, and other symptoms of partial paralysis. He was quite incapacitated for business, and there was complete insomnia. He obtained some relief by a visit to the sea-side and rest, but at the end of six weeks, when I first saw him, all the above symptoms were present in some degree, and he complained bitterly of the want of sleep. Ordered half a drachm of the hydrate of chloral every night, with bromide of potassium three times a day. The chloral at once gave him good nights, and the two sedatives combined restored him to himself in about ten days.

Case 3.—Melancholia with Delusions — Insomnia.—A young lady, about 30 years of age, took the hydrate of chloral for several nights in succession for the sleeplessness which frequently accompanies similar cases, other remedies being used to restore the functions of the liver and skin, which were defective. The chloral only procured interrupted sleep during its use; but after it was discontinued, healthy sleep became the rule, in place of the previous insomnia. I have witnessed this good effect of the hydrate in other cases.

Case 4.—Inveterate Pains of a Neuralgic Character.—A middle-aged person, much harrassed by a large business, had suffered for the last two or three years from neuralgia of the nerves of the trunk and extremities, frequently changing its seat—the pain, when present, being intolerable. After exhausting almost all remedies but the right one—*i.e.*, temporary relinquishment of business—he learnt the use of the hypodermic injection of morphia, and it was his habit to have recourse to it whenever the pain became severe, sometimes several times a day. This relieved, but never cured, his pains. He was, at the time I saw him, anæmic, dyspeptic, feeble, restless, and sleepless. With some difficulty I persuaded him to give up the use of the morphia, and to take the hydrate of chloral at bed-time. He missed the soothing effect of the morphia greatly at first, but he was induced to persevere, and has not now had recourse to it for several months. The chloral, after a few trials, gave him better rest and sleep, which enabled him to battle with his pains by day without having to fly to the morphia. It was persevered in, and, with suitable remedies applied to the enfeebled digestive organs, chiefly small doses of strychnia, he soon conquered his dyspepsia. He has regained blood and flesh, and now does very well without either the chloral or the morphia. The principal credit I claim for the chloral in this case is that it enabled the patient to conquer the dangerous habit of imbibing morphia for every attack of pain and so gave

the system a chance of righting itself, which it could not have had whilst opiates were used in any form, as in this individual they were never well tolerated.

Case 5. — Tumour, presumed, at the Base of the Brain.—A young lady, aged 24, had suffered for about eighteen months from the following symptoms:—Constant pain referred to the back of the head and nape of the neck; partial and variable paralysis of the right arm and leg; great dysphagia, liquids being forcibly rejected through the mouth and nose; speech thick, with hebetude of intellect and drowsiness, and yet almost constant insomnia. These symptoms had supervened soon after a somewhat unhappy marriage. I gave the chloral in half drachm doses for a few nights, but it failed to secure any good sleep, and, fearing some ill effect upon the medulla oblongata, it was given up. No ill effect, however, appeared to follow its temporary use.

To subdue the pain and sleeplessness arising from the application of a blister, I constantly order a full dose of chloral to be taken from two to three hours after its application. The patients have invariably passed good nights, and awoke with the vesication completed. Faceache from decaying teeth, or from abscess of the gums, has also yielded to the sleep-compelling influence of the hydrate.

Case 6.—Obstinate Chorea.—A young girl, aged 17, the subject of long-standing and obstinate bilateral chorea, had been treated during many weeks of the present spring with the usual remedies—tonics, &c.—without much effect. She was not anæmic, but thin and haggard from the constant jactitation and loss of sleep. Placed under my usual treatment—i.e., a liberal allowance of wine added to good diet—the chorea still resisted, and the girl became very much reduced. Sleeplessness was a marked feature of her case from the beginning. At first the chloral was given in half-drachm doses at night, with the effect of procuring some sleep, but with no abatement of the choreal movements by day. I now resolved to try the effect of keeping the girl under the continual influence of the chloral. She was ordered to take eight grains three or four times a-day. This was afterwards increased to eight grains every four hours throughout the day and night. This treatment was continued for nine days, by which time all choreal movements had entirely ceased. The girl was excessively drowsy and languid all through the day, but ate well, and the digestive functions were not interfered with. After a little quinine and iron to recruit her strength, this girl left the house quite restored.—*Medical Times and Gazette*, Sept. 17, 1870, p. 334.

30.—CHLORAL IN CASES OF INSANITY.

By G. B. WADSWORTH, Esq., Assistant Medical Officer, Suffolk County Asylum.

Having read many inquiries and suggestions as to the best mode of administering the hydrate of chloral, I beg to offer the following cases taken from the case-book of the Suffolk County Asylum, within the last three months, and shall be happy to see them inserted, if of sufficient value.

Case 1.—H. M., male, aged 51, was admitted May 21st, for the fourth time, in a very excitable state from recurrent mania. With ordinary diet and attention to his general health, he improved sufficiently to go to work. On the 18th of June, I was called to him, as he had suddenly, when dressing in the morning, tried to jump through the window. I found him in every way suffering from acute mania. He would take no medicine; but, when asked to take a glass of porter, said that he would. Sixty grains of chloral were administered in porter; and fifty minutes afterwards he was in a calm sleep, which continued nine hours. At seven o'clock, he awoke and wanted something to eat; he took meat, bread, and porter, with forty grains of chloral. This was followed by a good night; he slept ten hours, awoke hungry, and took food plentifully. His bowels acted well. He has since continued quiet, and is now approaching convalescence, and again commencing work.

Case 2.—M. A. B., female, aged 19, was admitted June 9th. She was cruelly bound hands and feet, and was immediately released, and placed in the padded room. She was suffering from acute mania. She refused food with obstinacy, but after some little time called out for water. She was induced to drink a glass of porter which had sixty grains of chloral dissolved in it. In forty minutes she was in a calm sleep, which lasted ten hours. She awoke hungry, and had beef-tea, and another glass of porter with forty grains of chloral. She has continued taking the chloral in porter three times a day, in doses gradually decreasing to fifteen grains, with marked improvement, and is now recovering.

Case 3.—R. B., female, aged 59, was admitted June 22nd. She had all the symptoms of melancholia canina. On my entering her room, she was crouched in one corner, but came towards me on her hands and feet, barking savagely. Seeing the nurse with a glass of medicine in her hand, she rushed at her. As I could make no examination, I could only judge the pulse to be over 150 per minute. On the partial subsidence of violence, she was induced to take a glass of porter with sixty grains of chloral dissolved in it. In fifty minutes she was in a calm sleep, which lasted eight hours; pulse 84, respirations 18 per minute. She

was then willing to take support in sufficient quantity, and had porter, with forty grains of chloral dissolved in it. This produced a good night's sleep, which has continued uninterruptedly each night, the chloral being repeated in decreasing doses to fifteen grains three times a day. She is now gradually improving, the unnatural noise not having been heard since the third day from her admission, and she now converses rationally.—*Brit. Med. Journal*, July 16, 1870, p. 62.

31.—REMARKS ON THE ACTION OF THE HYDRATE OF
CHLORAL IN PARALYSIS OF THE INSANE AND
OTHER FORMS OF INSANITY.

By Dr. WILLIAM MACLEOD, Deputy Inspector-General of
Hospitals and Fleets, Royal Naval Hospital, Great
Yarmouth.

[What is wanted in cases of insanity is an agent which will not only give good rest by night, but which, if given in smaller quantity by day will soothe and calm the patient, and act on the sensory ganglia, which evidently are the parts of the nervous tissue chiefly involved. Hydrate of chloral will, in a great measure, fulfil these ends if properly and judiciously administered.]

In all the eight destructive cases, with doses varying from fifteen to thirty grains, good sleep was procured for seven and eight hours, and not attended by loss of appetite, constipation, drowsiness, or morning sickness. In most of the cases the sleep was followed by a general calming influence, more so than after any other hypnotic, and which continued for several hours. One patient required forty-five grains to cause sleep when in the sick ward; but place the same patient in a dark cabin by night, and twenty grains will induce sleep. This patient is in the first stage of the disease, full of exalted delusions, very noisy, shouting to such an extent as to be heard all over the building, violent and destructive.

At night he is placed in a cabin by himself; fifteen grains are given him, and repeated every two hours until he sleeps. He passes a good night, and he is removed next morning to the sick ward, where he is washed and dressed. During five days of the seven he is quiet and easily managed, and this calm state often continues until bedtime. On other mornings he is not, however, quite so well; he is like a giant refreshed with sleep, and will in a short time upset the ward, tear his clothing, and destroy some of the furniture. Let ten or fifteen grains be given him, and it is astonishing how soon he becomes quiet, but he does not sleep. I prefer to see this calm condition produced during

the day, rather than sleep, as in this comparatively good state he can be sent to the airing ground with the other patients, and practically it is found that he gives no trouble. One morning I was walking in the quadrangle, when this man began to shout, and attempted to break one of the windows. I at once visited him and got him to take ten grains, and in a quarter of an hour he became calm, and began to hum hymns and say his prayers. In order to test the beneficial action of chloral, a few mornings ago I purposely refrained from giving it to him, when he began to show symptoms of violence, and, instead of giving it, I ordered an attendant specially to watch and take care of him. He soon became unmanageable; ten grains were given, which brought him round to his ordinary quiescent state. He began to take chloral on the 9th of March, and it has been continued to the 1st of July.

During the first thirty-one days, 815 grains were administered, giving him a daily average of 29 grains; for the next fifty days, 1,130 grains were given, the daily average being 22 grains; and from the first to the 20th of June, 490 grains were taken—the daily average was now slightly increased, as $24\frac{1}{2}$ grains were required.

It was then given up, in consequence of symptoms of prostration supervening, which, however, very soon passed away; and during the 21st, 22nd, 23rd, and 24th, he was so very quiet by day, and slept so well by night, that it was not necessary to give any. He seemed during this time as if under its influence: took his food well; appetite being, I may say, voracious. This, however, is a symptom of the disease in many instances. But in all patients who are under the influence of this medicine the appetite is found to be excellent.

On the 25th he became so very restless and violent that it was determined to give chloral as before. He required, on the first night, 45 grains, given at intervals of two hours, before he became calm; and up to the end of June, 20 grains daily were found to be sufficient. Between his entrance on the 5th March and the end of March, he lost 8 lbs. in weight; since then he has held his own up to the 16th June, and from that date to the 1st of July he has gained ground, looks better, is stronger, and walks with a firmer step.

Another patient, who is far advanced in nerve-softening, being demented, noisy, destructive, and who for three days and nights before he took chloral did not sleep a wink, required 45 grains before he slept, and then slept for eight hours. During the following three days and nights the calming influence continued, and he slept at intervals, the attendant feeding him when awake. At the end of the three days he again became restless, noisy, and destructive; and on the evening of the

fourth day I began to administer 15 grains every two hours until he had taken 60 grains, when sleep supervened. He slept at this time nine hours, and it was followed by a calming and soothing effect for three days and nights. Since then a small quantity—some nights 15 grains, other nights 22 grains—causes good sleep, and of late the quantity has been reduced to 10 grains.

It is not now administered every night, but given when the patient begins to show symptoms of restlessness. It is found that if it is neglected to be given when these symptoms present, and he is allowed to be noisy for a whole night, or even for a few hours, a much larger dose is necessary in order to calm him. What answers in each individual case must be discovered by experience, and it is individual treatment that will prove beneficial. He has had from first to last 1020 grains without a bad symptom.

I might proceed and state the individual treatment of the other six destructive cases, but it would be, in a great measure, a repetition. It is not only in the noisy and destructive cases that this remedy will be found useful, but also in the treatment of those patients who, although not destructive, are full of exalted delusions, and at stated periods become excited and troublesome. I shall mention one case: he is full of exalted delusions; one day expecting to be Governor-General of India, and another day to command the Channel Fleet. He is constantly subject to abnormal sensations that certain portions of his body are removed from him, stomach being torn out of him, and a dragging sensation at his heart. Hallucinations of hearing are common as well as illusions of vision. Memory is very defective. For his own safety he requires to be continually under observation. He therefore sleeps by night under the observation of the watch; when awake by night he is abusive of every one, accusing the attendants of causing the abnormal sensations. So fully impressed is he with the belief that they cause these sensations, that whenever he sees me he makes complaints against one and all of cruel treatment. By day it is a repetition of the same complaints, with an occasional growl against an ungrateful country for having forgotten such a distinguished servant. This patient, before his illness, was one of the most amiable of men, but before he began to take chloral his language became unbearable. On the 3rd April he began to take 15 grains at bedtime in a glass of brandy and water, and it has been continued daily until the 27th June, 735 grains having been taken during that time without a bad symptom. His nights have been excellent; he has not, on any occasion, disturbed the other patients; and in the morning, instead of being exceedingly troublesome to every one, he is quiet and civil to all. This

happy state continues until after dinner, when the influence gradually passes away and he gets into a talkative mood. As he is, however, at this time in the open air, it is not necessary to repeat the chloral. I have no doubt 10 grains at this time would calm him; my desire is to reserve it for a more advanced period of the disease. Digitalis in this patient soon caused an intermitting pulse, and hypodermic injections of morphia produced sleep for a few hours, but as soon as the sleep passed away he was worse than before, particularly as to the abnormal sensations, and he required purgatives to act on the bowels. On the other hand, under the chloral treatment all the natural functions are performed regularly; he has gained flesh, and is certainly more rational.

It often happens that after a patient has passed through the first stage of the disease he gets comparatively well; the exalted delusions vanish, and he becomes comparatively rational, although the external physical symptoms remain, such as thickness of speech and diminished motor power. Many thus get so well, that when friends visit them, they find them so much improved that they are deceived, and flatter themselves that they are quite well. Patients in this state are most uncertain in their conduct; suddenly they break out with their delusions. As, for instance, such a patient came to me two days ago, informing me he had just received a message from heaven that the Saviour was to appear on earth at twelve noon to-day, and he was to attend him. He became restless and excited during the rest of the day, and more so as the evening advanced. At bedtime he had 20 grains given him in half a tumbler of porter, and this has been repeated as often as the exalted delusions and other symptoms return. These exalted delusions, commonly called mental, are as much physical, and the result of diseased action in the membranes, convolutions of the brain and central ganglia, as the diminished sensation and motor power are the result of softening of the cervical and dorsal portions of the spinal cord.

This remedy has been found equally useful to the patients who are permanently confined to bed; who are perfectly helpless, but who are noisy, and can destroy bedding with their fingers and teeth; and my present impression is, the more helpless the patient is, the less does he require of the medicine, if it be given whenever he begins to give evidence of an inclination to be noisy.

In the cases mentioned the daily average quantity of chloral given, instead of increasing has diminished, while keeping up the hypnotic action by night, and quiescent state by day. This class of patients was previously treated in a great measure by constant and careful watching, by digitalis alone, or in com-

bination with hydrocyanic acid; by hypodermic injections of acetate of morphia; by belladonna, hyoscyamus, oxide of zinc, bromide of potassium, stimulants, and plenty of exercise. Good nights were in many cases procured; but I could point out several instances where no treatment availed, and even the stormy and rugged path to the grave could not be calmed or made smooth. Careful watching and nursing are as necessary as ever, but with the assistance of chloral it is comparatively made easy. The second case mentioned above was, before the administration of chloral, a most troublesome one. Digitalis, when given, calmed him for the time, but acted as a powerful depressing agent. Hypodermic injection of acetate of morphia, although it caused sleep, produced great irritation of the stomach next morning, so that it had to be discontinued. He was also very destructive; now he is quiet, easily managed, has gained flesh and strength, and certainly can walk better.

From the rest induced in one and all, a great change for the better has taken place, and I am able to say, in one word, that during the last four months not a rag has been torn, nor an article of furniture destroyed. In the cases under consideration the bowels, as a rule, were obstinately constipated, there being a total want of peristaltic movement, requiring turpentine enemas twice or three times a week, as well as the frequent introduction of the catheter; since they have been brought under the continued influence of chloral purgatives are seldom used, and no catheter has been required, nor have I found it necessary to feed any of them by stomach-pump. I do not ascribe the good change to any direct curative action of the medicine, knowing as I do now some of the more important pathological facts connected with this disease when once it has made progress; but I attribute it to the improved rest by night, and calming influence by day, together with the arrest, in a great measure, of the constant waste, not only of the nerve-tissue, but of all the tissues. Exhausting exercise or labour of any kind is, in my opinion, very hurtful; the quieter a patient can be kept the better. Whether this treatment can be carried out for any lengthened period, and if so, whether it will be attended by extending the lives of such patients, remains to be seen.

All the above facts force one to conclude:

1. That in paralysis of the insane, where the patients are destructive and violent, the judicious administration of chloral acts as an excellent hypnotic by night and soothing agent by day.
2. That under its action the patients have been free from destructive habits, and have gained in weight and strength.

3. That in one case as much as 2,810 grains were taken during ninety-five days, the daily average taken being 30 grains, with no bad symptoms. In a second case as much as 2,435 grains were taken during 122 days, being at the rate of 22 grains daily; when the patient gave evidence of prostration. A third patient took 2,380 grains during eighty days, the daily average being 28 grains, with no bad symptoms. A fourth patient took 1,362 grains during sixty-seven days, the daily average being 20 grains, with no bad symptoms. A fifth patient took 501 in twenty-four days, giving a daily average of 25 grains, with no bad symptoms.

4. That under it the action of the bowels and bladder have improved.

5. That in no case has there been a refusal of food; on the contrary, the appetite of the paralytic patients increased.

6. That patients suffering from abnormal sensation derived much benefit from it.

7. That in patients subject to hallucinations of hearing, with suicidal tendencies, it has cut short the hallucinations.

8. That in patients liable to hallucinations of hearing, and under their influence becoming excited and noisy, it has produced calm.

9. That in patients with a propensity periodically to maim and hurt themselves, the desire has passed away under the influence of chloral.

10. That in patients who suffer incessantly from voices, it has been given with partial benefit only. This refers to patients who were aware that the voices depended on morbid sensations.

11. In certain cases of melancholia benefit was derived from its administration, and convalescence advanced.

12. That in another case of melancholia with extreme depression, and the intellect being good, no permanent benefit was derived, except that under its administration the bloody exudation from the stomach completely disappeared.

13. That the greater the disorganisation of the brain and cord (as judged by the symptoms, and especially by thermometrical observations) the sooner does the system come under chloral action.

I have not given the thermometrical observations, as they would make the paper too long.

In these remarks I am fully borne out by the assisting staff surgeon of the hospital, Dr. Wheeler, who has with me carefully watched the progress made by the different patients under treatment.—*Practitioner*, Aug. 1870, p. 66.

32.—CASE OF HYDROPHOBIA.

By Dr. THOMAS DAVIDSON.

[It appears that there are members of our profession who doubt whether there really is such a disease as hydrophobia. It was, however, noticed by Aristotle in the dog, and described by him 320 years before Christ.]

On May 20th, 1870, Thomas Cowan, $8\frac{1}{2}$ years of age, was bitten by a terrier dog. The boy was passing quietly along the street on his way home from school about midday, when two ladies followed by a dog came out of a house a short distance from him. The dog without any provocation instantly sprung at him, pulled him to the ground, and bit him severely in various parts of the body. I saw him about twenty minutes afterwards in the house of a gentleman who witnessed the accident, and had assisted in taking the dog off the boy. I was told by the person who came for me that the wounds were bleeding severely, and on approaching the house where the boy was, I noticed a considerable quantity of blood on the street. I found him pale and faint from the shock and loss of blood, but the hemorrhage had ceased. After he drank a cup of tea the faintness speedily passed off. I dressed the wounds in a temporary way, and had him taken home in a conveyance to his mother's residence and completed the dressing. I found an extensive lacerated wound extending from the outer angle of the right orbit to near the centre of forehead, and embracing the entire eyebrow and upper eyelid, which were hanging as a flap near the nose, and partly exposing the globe of the eye. The dog's teeth must have pressed upon the latter, but it was not perceptibly injured. These were also several severe wounds all over the forehead; in the centre there was a deep indentation down to the bone, evidently done by a large canine tooth. There was also a lacerated wound in the chin. On examining his left arm I found several teeth marks on both sides, the dog having had a firm grasp of the arm in his mouth, the marks of the teeth of both jaws being quite distinct. The canine teeth had entered deeply into the arm. On the right thigh there were also several deep wounds.

The owner of the dog being present, assured me there was no disease about the animal, it never having shown any symptoms of rabies. To prevent it injuring any other person it was shot, after it had resisted the action of a powerful poison, which had been given for the purpose of destroying it. The wounds from their situation and number rendered excision and cauterisation out of the question. I therefore washed them carefully and applied carbolic acid, replaced the flap, securing it by wire sutures, at the same time directing hot poultices should be applied to the different parts until the evening. I at that time

removed them, substituting a mixture of linseed oil and carbolic acid. On visiting the patient next morning I found him going on very well; his general health was good, there was no fever, the wounds presenting a favourable appearance, and healed perfectly in about ten or twelve days without the least deformity about the eye. The boy got out of bed occasionally after the eighth day, and being a cheerful, happy little fellow, he played about the house, showing no anxiety or nervous depression. After the twelfth day, the wounds having quite healed, he was allowed to go out and play about the doors with his companions for a short time daily, the weather being warm and genial. I had never mentioned that hydrophobia was likely to result, nor had I any dread of its appearing in this case, as no one considered that the dog was affected by canine madness. The patient's mother, and his aunt, who resided in the same house, assured me it had never been mentioned to them or the boy that such a dire disease was likely to follow, nor was he at any time either annoyed or frightened after being bit. On Sunday, June 5th, he appeared in perfect health, and was quite cheerful and happy. A fearful change, however, was shortly about to take place. On June 7th, eighteen days after the accident, I was called at eight o'clock in the evening to see him. His mother informed me he had complained all that day of pains about the neck, head, and face, but not particularly about the bitten parts. Although he had been able to amuse himself with his companions as usual about the doors, he had taken very little food during the day, and could not take his tea in the evening. I found him in bed suffering from intense fever and vomiting, which I was informed had come on about an hour previously. The pulse was 130, hard, and incompressible; tongue clean; skin particularly hot and dry. The symptoms indicated severe functional fever, yet there was an indescribable appearance which I thought I had never seen before in any case. When I asked him if he had any pain he replied he had pain in his head. There was no thirst, but his mother informed me on enquiry that he had drunk a little tea, which he swallowed without any difficulty. I prescribed a mixture composed of aqua acet. ammon., spt. æth. nitros., vin. ipecac., to be given frequently in warm water and sugar, directing at the same time that the extremities should be occasionally sponged with tepid water and vinegar. On visiting him on Wednesday morning the fever had somewhat abated, the vomiting had ceased during the night, the pulse was 120 and firm; the tongue appeared as if it had got a coating of thin white glistening varnish. A laxative was administered, and the mixture continued. The symptoms remained unchanged until early on Thursday, the 9th. I saw him about 7 a.m. His mother stated he had scarcely slept

during the night, having been extremely restless, tossing about the bed, and changing his position every few minutes, and had not been able to swallow anything after two or three o'clock in the morning. I offered him a teaspoonful of tepid milk; he readily opened his mouth, but in a quick hurried manner, the moment the fluid touched his tongue or palate, it was instantly ejected with force. Being at the same time seized with a fit of suffocating spasm, he sobbed or sighed heavily, and threw about his arms. His features were much convulsed, and expressed the greatest dread and horror; the muscles of the larynx, pharynx, and trunk all became agitated by convulsions, which lasted for about a minute. After the fit had subsided his features became quite natural, and indicated very little appearance of disease or suffering. Nor was he either excited or talkative, as has been seen in some cases of the same disease; his intellect was unaffected. After waiting a short time I breathed gently in his face, when the same sobbing, choking, and convulsed condition came on as when he attempted to swallow fluids. I then informed his friends it was a decided case of hydrophobia. He could now, and at any time during the progress of the disease, open his mouth freely, and protrude his tongue when requested to do so. The term hydrophobia—dread of water—was not very applicable in this case, as he seemed to have no actual dread of it, as he a short time after this asked for a drink of water; the act of deglutition and remembrance of the pain and difficulty in attempting it caused dread, as I observed. Although he asked for fluids, when they were presented he suddenly pushed them away, and said he could not swallow. Pantophobia (a fear of all things) or phobodipsos (fear of thirst)—names given by ancient writers—seem more accurate. During the course of the forenoon I asked Drs. Cahill and Gracey to see the case with me. One of these gentlemen, feeling the patient's pulse with cold fingers, instantly threw him into the convulsed state before described. I noticed the application of the patient's own finger to his face produced the same effect. The instant it came in contact with the skin he started as if he had received a sharp shock of electricity; he sobbed, threw his arms out, and the usual convulsion of the face and trunk followed. Having directed one of the attendants to pour water from one vessel to another in such a position as he could not see the water, the sound alone produced the same dreadful symptoms.

The medical gentlemen named entirely concurred with me in my views of the case, and it was mentioned in the discussion which followed that the fits did not resemble tetanus, epilepsy, apoplexy, or convulsion in any form which we had ever witnessed during a practice extending from twenty to thirty years.

With respect to treatment, we had little faith in any known remedy, believing that no record exists of a single recovery from this fearful disease either by art or from the efforts of nature when the symptoms of the malady are fully established and well marked. Chloral was spoken of, but as he had lost the power of swallowing it was never tried; it would possibly have proved of as little efficacy as any of the various remedies which have been tried, as its effects seem to be chiefly upon the cerebrum; but from what I saw in this case I am led to conclude that the spinal nerves are more implicated than the cranial. I had the bowels freely moved by a purgative enema; a dose of calomel, scammony, and jalap was given in divided doses, mixed in stiff jelly, which he masticated and swallowed without much difficulty. A beef-tea enema, containing tinct. opii, was directed to be given, but had to be laid aside, as it brought on the fits. A heated-air bath was extemporised by getting a tin tube made about four feet in length, with inverted funnel-shaped mouth. A lobster "creeve" was obtained. After removing the "net" the frame was placed over the patient's body, and covered with the bed-clothes. Placing a spirit lamp below the funnel, the heated air was conducted within the frame, and an excellent air-bath was established. A slight moisture over the surface of the body was soon produced; the bath was continued for several hours. The powder moved the bowels freely; the tongue assumed a more natural appearance; he seemed more tranquil, and the fits not quite so frequent; and he had eaten a small biscuit during the afternoon. Many spontaneous attacks occurred during the day, but care was taken not to induce them by any exciting cause. About 7 p.m., the fits becoming more frequent and severe, inhalation of chloroform was now tried, and persevered in for two hours; but, instead of soothing him, it seemed to have the opposite effect—complete anæsthesia could not be induced for more than two or three minutes at a time. Three ounces of Messrs. Duncan and Flockhart's best chloroform were used, then discontinued. The fits were so severe and the struggling so great, he had to be kept in bed. A sheet was fixed over the frame of the bed for that purpose, and was found quite effectual. As the disease progressed he became more exhausted, the pulse weak and irregular. He continued perfectly sensible until the last. When I asked him, a quarter of an hour before his death, if he felt any pain, he answered instantly that his eyes and his hair were painful. His eyes, for an hour before dissolution, appeared projecting from their sockets; the eyelids retracted in a perfect circle, giving to his countenance a look of dread and horror which was painful to witness. The muscles of the scalp were also affected with

spasm, causing his hair to stand almost straight out. There never appeared any unusual amount of fluid about his mouth, and nothing like "slaver" until an hour before his death, when he frequently vomited about a table-spoonful of viscid, clear mucus slightly mixed with froth. Occasionally a spot of blood was observed in the matter vomited. He complained that the light of a candle pained him. I left him at 12.30 a.m., and was informed that ten minutes afterwards he vomited about a pint of dark-coloured blood, when death quietly took place in a few minutes without any convulsion, on the twentieth day after the accident and twenty hours after decided hydrophobic symptoms were presented.—*Medical Times and Gazette*, Aug. 27, 1870, p. 234.

DISEASES OF THE ORGANS OF CIRCULATION.

33.—PALPITATION: ITS DIAGNOSTIC VALUE.

By Dr. J. MILNER FOTHERGILL, Senior Resident Medical Officer of the Leeds Public Dispensary.

Though the oldest known symptom of heart disorder, palpitation has never had any exact diagnostic value attached to it. It has been hitherto regarded as excited or increased action of the heart, without any reference to its causation. It may be fairly questioned whether this even is in accordance with fact. From a careful consideration of the subject for some time past, I have been led to regard it as solely diagnostic of a disturbance of the balance which exists between the blood to be driven by the heart and the power to drive it; and that, too, in the direction of cardiac inability. This impression is constantly growing stronger. The idea is founded not only on its exciting causes, but also on the known action of the remedies which enjoy the greatest reputation for efficacy in allaying it. It appears to be the first evidence of over-taxation of the heart, of which irregularity (in time, not in volume—that rather belongs to mitral regurgitation) is the next, and intermittency the most serious. This idea may appear more or less novel, but probably less. Having been for some time past engaged in an investigation into the mode and manner of production and action of heart disorder and disease, it may not be presumptuous to offer my conclusions, and why I have formed them, to the notice of the profession.

Palpitation, then, to commence broadly, is usually associated with exertion, nervous excitement, or general exhaustion, no matter how produced. It can be no subject for doubt that many persons know palpitation only after excitement in a heart structurally sound, others after exertion in a heart structurally

diseased. But in each it may be the chief burden of complaint; indeed, in the person with the sound heart it may be more severe and alarming. Though connected with such apparently different conditions, its diagnostic value is unaltered. It has been regarded as over-action: the truth seems to be, rather, that action is more apparent. The extreme of healthy action is utter unconsciousness that such action exists. The evidence of that action, then, is scarcely to be regarded as an evidence of power. Though hypertrophy and palpitation are often found together, palpitation is much more intimately associated with dilatation. Hypertrophy evidences that there is some disturbing force in operation by which increased action and power on the part of the heart are called for; otherwise hypertrophy could not exist. We are unacquainted with any growth of muscular fibre which is not occasioned by increase of demand upon it. In the silently acting organic muscular fibre this is most apparent. Thus it occurs in the stomach before a pylorus narrowed by scirrhus in the bowel in the presence of a chronic obstruction; in the bladder from prostatic change or stricture. So in the heart we have hypertrophy from the demand for it, and can no more conceive a spontaneous un-called for hypertrophy of muscular fibre in the heart than anywhere else. Palpitation evidences the demand, and indicates the compensation to be still incomplete. But it is connected with the demand on the heart; not called forth by the increase of muscular power. Of old, hypertrophy was regarded as a disease, and was met by bleeding and starvation. It was regarded as an abnormal development of power, and, as such, was attacked as a disease. We now know that it is a compensatory growth; and, consequently, the more perfect the hypertrophy the less does the patient or any one else hear or know of it. So palpitation, which has been regarded as over-action, and treated accordingly, will soon be seen to be an evidence of the muscular power being taxed or wanting, and that it is connected with the want of power, not the excess of it. Palpitation is, like the pain in the distended bladder, an evidence that the muscular action is called on; but it is not that it is too strong for the work, but that it is unequal to it. In dilatation, with or without valvular disease, is palpitation most common in the structurally altered heart. It cannot, then, be an evidence of over-action, as the old theory ran; because then the palpitation should be absent on exertion and present in quietude. Now we all know that such is not the case. In this condition effort calls out palpitation, as occasioning an addition to the heart's labour. The muscles cross the arteries and impede the flow of the blood. Wardrop even called this the musculo-cardiac function, and thought it beneficial by filling the heart's chambers with blood, which it most unquestionably does. But

in dilatation the essence of the disease is that the ventricles are always too full, and never completely emptied. The ventricle, no longer able to close completely in systole, is partially full to commence with on diastole, the distended auricle and veins drive in the blood under increased pressure, the fibres become overstretched, distension results, and contraction is impaired. "Dilatation of the heart is a purely mechanical effect of over-distension." Palpitation, then, ought, on the old theory, to act as a curative agent in dilatation, and ought consistently to occur when there is no great call on the heart—that is, during quietude, when the demand is the least. But notoriously it occurs in exertion, when the impeded flow of blood would act against this over-action. This creed is untenable, and may be left without further comment to the decision of my readers. In the structurally diseased heart effort is the common cause of palpitation. A species of balance has been struck between the power of the heart and the work to be performed; the system has lowered to meet the heart; a leveling-down process has gone on; and effort, by disturbing this balance, evokes palpitation. Palpitation evidences that the muscular fibres are making an effort to meet the demand on them; not that they are inordinately successful. It is laboriousness, not excessive power, that is indicated by palpitation. When the heart is acting excitedly, as in exertion, it is only when that exertion has been excessive that anything like palpitation is evoked. Take a "striker" (a fore-hammerman), for instance, after a "heat." All his muscular energy is called out to accomplish all that it is possible to do before the metal cools. Take him at the finish, with the perspiration rolling down, panting, exhausted for the moment, and you find his heart palpitating, so violent is its action from the recent strain upon it. But its effect is visible on the pulse, which is full and bounding, and in strict proportion to the action of the heart; and there it differs from palpitation. In excitement a similar violent action is seen sometimes, but the arterial pulse is again affected and reveals the excitement. But these conditions are not true palpitation. According to the old theory, palpitation ought to occur to the striker when unemployed, as the heart then could not have enough to do. Of course some readers may say, "And so it does." Certainly in time it does, as it does in anyone else where violent calls on the heart are inducing structural change. According to the old theory, the heart, accustomed to exertion, ought to palpitate whenever a lessened call on it left it with some spare power, which is let off harmlessly as palpitation. So also in exertion the heart's action ought to be feebler in proportion to the obstruction offered. Whether what is consistent with the old theory is consistent with experience may be fairly questioned.

But, again, it may be said that palpitation occurs from excitement, and is nervous. But when we have eliminated the cases of Bright's disease and those so-called hysteric conditions accompanied by a contraction in the arteries and arterioles, the instances will be found to be very few, and to depend mainly on the presence of poisons, either taking their origin within the organism, as in bile-poisoning, for instance, or from the action of external agents, as nicotine. It is possible that there may exist conditions essentially nervous, where a derangement of the balance of nerve-supply to the heart, a disturbance of the balance existing between the cardiac ganglia of the sympathetic and the inhibitory action of the pneumogastric, may occasion palpitation; but of these conditions we do not yet know anything clinically. Nervous palpitation is a refuge in time of trouble only too commonly. Increasing knowledge of pathological conditions, and the advance of our acquaintance with the mode of action of disordered function, are shedding much light on what have been hitherto obscure cardiac derangements. Firstly came the connexion between disease of the kidneys and heart-changes. Traube attributed them to obstruction to the flow through the renal artery acting on the general systemic circulation; then came the idea of altered blood—in plain English, increased friction; and now Dr. Geo. Johnson has demonstrated a thickened muscular coat in the arterioles. The last theory supposes that the irritant action of the products of histolysis in the blood gives rise to a spasmodic action of the muscular tunic, in time leading inevitably, by the well-known law, to hypertrophy. Thus still greater obstruction is offered to the flow of blood, and the heart still more taxed. Thus when the blood is more than ordinarily laden with the products of retrograde tissue-metamorphosis, the excess irritates the arterioles, and more than usual contraction follows, and, as a consequence, impeded flow and palpitation. The balance existing between the altered muscular tunics and the heart's walls, also altered, is disturbed and the accommodation interfered with, and the extra call for action evokes palpitation. As to the frequency of palpitation among those suffering from Bright's disease, and its occurrence along with evidence from other sources of an accumulation of retrograding material in the blood, as a question of fact, I must leave to the experience of my readers.

In hysteria and allied nervous disorders we have palpitation without evidence of any structural change. So also it occurs in persons of bilious temperaments; it follows excessive tobacco smoking in nervous or weak persons, as it may also follow the administration of other agents which affect the heart. Whenever there is disturbance in the balance of nerve-forces it may occur. Whenever the heart is acting under disadvantageous

circumstances it is never long absent. Thus palpitation follows displacement, either transient or lasting. It persists in displacement from accident or disease. It is a common concomitant of a loaded stomach or great flatulence. Indeed, it may arise from any cause which, by pressure on the diaphragm, diminishes the space for the heart and impedes its beat. This looks rather like a laborious action than over-action or spare power. The heart is placed at a disadvantage, and palpitation takes the place of normal quiet contraction.

Palpitation is intimately associated with a disturbed or altered innervation; whenever, in fact, there is a disturbance in the balance of the heart's nerve-forces it may occur. In many cases of nervous palpitation—it would perhaps, be thought premature to say all—no increased action is felt in the arteries, great or small. Whatever nerve-derangement may induce the palpitation, there is no corresponding action in the arteries. The condition may be analogous to, and even homologous with, the disordered action of Graves' disease. In Graves' disease, and in some cases of chorea, the whole right ventricle seems violently thrown against the chest-walls with a large and forcible impulse; the impulse, too, being in the normal locality, not the large diffuse beat of dilatation a rib or so lower than natural. Certain it is that, not uncommonly, a violent action of the heart exists where the pulse is small, and even unusually constricted. This condition is common in women. It is evident, then, that, in this condition, where even the sphygmograph may not detect an unusual action in the arteries, the heart's action must be met or neutralised by some altered condition of the arteries. In some cases, too, there is no excitement in the large arteries, showing that the arterioles are not the only part affected. In hysteria we usually see this condition: the heart is acting with evident violence against no perceptible necessity. The patient is cold, the pulse small, the arteries evidently contracted, and the state of arterial tension is followed by a free flow of limpid urine, the result of an increased pressure on the glomeruli of the kidney. This condition has met with much elucidation from experiments performed by Ludwig, Thierry, the brothers Cyon, and von Bezold. (See "Carpenter's Human Physiology," 7th ed., p. 269.) In these experiments an excited action of the heart was evoked after every nerve-communication had been severed between the heart and the organism, the heart only being attached by its vessels. Irritation then applied to the medulla oblongata induced violent action of the heart, increasing its pulsations in rapidity. When only a small portion of the nerve-supply, the accelerator nerve, was left, there was increase of power as well as of rapidity—i. e., typical palpitation.

These experiments have thrown much light on the pathogeny of nervous palpitation, and from them we can easily see how and when long-continued tissue-changes will result. Thus is produced the nervous hypertrophy of writers. When, then, we find the arteries unaffected by the heart's action, it is evident that that action is met or neutralised by a condition existing in the arteries. That this condition is connected with vaso-motor changes in the calibre of the arteries and arterioles we are fast learning to see. Thus in nervous hypertrophy we see the effects of opposition offered to the flow of blood continued for some time. In nervous palpitation we see evidence of an extra demand on the heart, and of action to meet it. In nervous palpitation we are no longer driven to imagine a tumultuous action of the heart's fibres against each other—a condition which it is not easy to imagine, much less to offer any proof of. In the uterus sometimes is seen a want of synchronicity between the action of the different fibres, which was supposed to resemble palpitation; but even then it was merely a spasmodic action of a few fibres, not a tumultuous action of them all. If there is this antagonistic action in the fibres of the heart, it is certainly, so far as I know, unique, and foreign to the action of all other collections of fibres. In fact, there appears an inherent improbability in the possibility of its existence even; and such an explanation can only be admitted in default of any other one, and when every other known cause has been looked for and found wanting. Such an association is not associated with scrutiny, but with the want of it. I believe we will find that we can no more have a spontaneous, uncalled-for, palpitation than we can have an uncalled-for, spontaneous hypertrophy, though not long ago that was supposed to be a common occurrence. As hypertrophy has been found to be a compensatory change, so will palpitation be found to be merely a symptom of over-taxation, and that only.

As palpitation occurs in structurally altered hearts on exertion, so it will be found, in nervous affections (so called) of the heart, to be the evidence of the heart's struggling against some opposition offered to the flow of blood. It is scarcely credible that palpitation can be connected with what is so obviously effort in the one case, and be simply an evidence of excess of power in another case. That palpitation may be occasioned by external agents, as nicotine or white hellebore, which French soldiers used to take to simulate heart disease, or any other agent which will disturb the nerve-balance, is as unquestionable as that it may also be relieved by other external agents. Thus, though palpitation may be allayed, and a partial palsy produced, by morphia or prussic acid, the remedies which are in most repute are diffusible stimulants, digitalis, and belladonna. Experi-

ments on the frog have convinced me of what my clinical experience had long taught—namely, that digitalis and belladonna are really cardiac tonics—that is, they aid the ventricular contraction. They thus enable the heart to act more powerfully against the resistance offered, and in overcoming it the heart becomes quiet, regular, and normal; the quiet action or ability to act has taken the place of tumultuous effort; the ventricle can now contract without the visible effort—palpitation. That the effect of these agents is not to paralyse the heart's efforts is evident from the increased strength which is obtained by their exhibition. The relief is not due to their palsyng effort, but to their aiding contraction.

Palpitation may be due to a call on the right ventricle, where the excessive action (if it were so) of the ventricle would not cause any effect in the radial pulse, or systemic arteries. But to meet the question of palpitation by attributing it to an activity of the right ventricle only, in cases where effect on the arteries may be wanting, is simply to shirk the broad tissue. We know that the symptoms of overaction and demand on the right ventricle are widely different from those of simple palpitation; and that a totally opposite series of symptoms are then presented. We can scarcely, then, attribute palpitation to an over-action of the right ventricle only. That we may have a strong action of the right ventricle evoked when there is no stress upon the left ventricle is true; but in that case again it is effort to overcome obstruction. The fibres of the heart are, in many instances, common to both ventricles, and excited action in one cannot exist without an approximating condition of the other ventricle.

In considering the question of nervous palpitation without corresponding effect upon the arteries, we must remember that the cardiac ganglia act against the inhibitory action of the vagus, as well as against the blood-column. It is possible, then, that there may be a disturbance of the balance between them. But then there would be a long irregular systole, as is seen when the balance is disturbed by poisons. In this condition the muscular fibres can take no part, except in acting in accordance with the nerve-force brought to bear on them. But in this disturbance of the nerve-balance the action is irregular, slow, and intermitting, according as some ganglia are more or less acted upon, and bears no resemblance to palpitation. Neither does galvanising the vagus, as done by Weber, act in a manner at all analogous to palpitation. There is arrest of contraction, with one or two powerful beats on cessation of the stimulus; but this is not palpitation.

In palpitation from dreaded loss of blood, as in uterine hemorrhage, we have what may truly be called over-action, by

a reduction in the opposition offered to the ventricular contraction: the ventricular action is not excessive, but the blood no longer offers its wonted opposition. Now, muscular action must produce results either in overcoming opposition offered, or in unnatural contraction of itself—*i. e.*, spasm. When, then, in this condition the muscular fibres are less distended by influx of blood, the energy is manifested in abnormal contraction, and ends finally in confirmed systole as occurs in animals bled to death. The heart is here firmly contracted until it is impossible to contract further, but during this time the animal has died. Muscular action cannot go on without result; and if we have an action in the muscular fibres which is not met by some opposing force, unnatural contraction, or spasm, must ensue; and if palpitation were truly over-action of the heart, it would be one of the most dangerous and fatal of conditions. The further the inquiry is pushed, the less evidence can we find in favour of palpitation being over-action of the heart, it is a laborious effort, either from increased demand on the heart, or unfitness in itself. The heart, when its integrity is impaired or it is exhausted by effort, palpitates—*i. e.*, a laborious evident effort takes the place of the steady normal contraction. If the obstruction offered is not at first sight apparent, it is nevertheless there. Muscular action cannot be barren in results: the ventricular action must either be apparent in the arteries, be neutralised by some condition existing in them, or end in self-contraction.

Palpitation, as a temporary evidence of over-taxation, may be engrafted on chronic conditions of acknowledged failure of power. Thus in valvular disease, or dilatation, we may have irregularity, or even intermittency, as persistent evidences of cardiac asthenia, and along with this an enfeebled general condition: that a balance has been struck by the lowering of the general condition to meet the heart's enfeebled state. On this we may have implanted palpitation on exertion, as evidencing a temporary overthrow of that balance: no pathological condition is more common in fact. If, then, palpitation were truly over-action of the heart, the sufferer ought to feel more equal to exertion during its occurrence; it ought to restore again to him that power the want of which has so crippled him. In asthenic conditions palpitation ought to be a tonic, and it ought also to occur most frequently among the robust and those accustomed to exertion;—*i. e.*, palpitation ought to occur when the heart has not its accustomed exertion to undergo, during general quietude. Whether such is the case, or palpitation is found to occur on or after exertion in asthenic conditions, I will leave to others to decide, as it is a question of fact. My own experience has been unequivocal. As not being normal

action, it must be connected with either excess or deficiency of power. As to whether it is associated I leave to our common experience. If it be allowable to anticipate and to pry into the future, it may safely be predicted that in time we shall come to learn that palpitation is as surely the evidence of over-taxation of the heart's powers, as we have learnt that cardiac hypertrophy is a compensatory growth, the result of a persistent call upon the heart for augmented effort. "It must be recollected that, in every organic disease of the heart, when palpitation becomes extremely violent and prolonged, both the impulse and the sounds may be diminished: in other words, the heart becomes gorged and incapable of adequately contracting on its contents, sometimes yielding a struggling convulsive impulse, with little sound and a feeble pulse, and, in an ulterior degree, especially during dissolution, scarcely producing either impulse, sound, or pulse. Suffocative dyspnoea, lividity, and extreme distress, are always concomitant symptoms." So wrote Hope even twenty years ago.—*Lancet*, August 6 and 13, 1870, pp. 179, 210.

34.—ON ANGINA PECTORIS.

By Dr. JOHN CHAPMAN, Physician to the Farringdon Dispensary.

Of all the various and agonizing forms which neuralgia assumes, this is at once the most terrific and the most fatal. It manifests itself differently in different cases, but in all, or nearly all, certain characteristic and exceedingly impressive features are observable. An apparently healthy man, probably over forty years of age, may be walking rather more briskly than usual, or may be going up-stairs, when he is suddenly seized with a dreadful and indescribable pain usually referred to the heart as its chief seat, and accompanied by a sense of violent constriction of, or of pressure on, the chest. Generally while the paroxysm lasts the patient's anguish is horribly severe, and filled with terror, the sufferer feels as if in the very agony of death. Indeed many patients have the impression, as Sir Thomas Watson observes, "that to continue the exertion which has produced the attack—to stir another step—would be fatal." And yet as soon as the attack has subsided its victim is left much in the same condition as he was before he suffered it, and in many cases may quickly afterwards resume his walk or usual occupation as if nothing had happened. In many other cases, however, the paroxysms are so easily provoked, that the patient is compelled to be conscious of his every movement, and always assiduously on his guard. But in some cases no amount of

care suffices to ward off attacks if the patient should venture on any muscular exertion. Trousseau mentions some striking instances of this kind. One gentleman induced oppression in the chest by the least active exercise, even by signing a number of official documents in quick succession; another, "if he happened to walk up the least ascent," says that eminent physician, "was instantly seized with pain, and was compelled to stop. He had just come from Lyons on the day when he consulted me. He had travelled all night, and as he came out of the railway carriage he had to walk a few steps about the station to get a cab. Although he walked quietly, he was seized so violently that he had a kind of fainting fit, and was obliged to sit down in the mud." Besides the feeling of impending death experienced during severe paroxysms, violent pains often extend over the base of the neck, the left mammary region, the left shoulder, down the left arm, beneath the shoulder blade, backwards to the spine, and sometimes, especially in very severe attacks, along the right extremity also. Indeed, in some cases the pain spreads still more extensively. In a case mentioned by Trousseau "the pain started from the pre-cordial region, and radiated from it to the base of the chest, producing there a sensation of constriction which the patient compared to that which might be caused by an iron girdle tightened with force, It then spread to the loins, and ascending towards the cervical region, attacked the left arm, and extended into the very tips of the fingers." As a rule, however, the pain is mainly restricted to the left side. In some cases the region of pain in the arm is curiously limited, stopping short at some special point, about the insertion of the deltoid muscle, for example, or at the elbow, or at the wrist. Occasionally the pain begins in the left upper extremity, and seemingly advances to the heart. In one of Trousseau's cases "the pain began at first in both shoulders, spread rapidly to the tongue, the neck, and then to the arms and chest;" in another "it began with an acute pain in the muscles of the left arm, and radiated from there towards the chest, a little above the heart." Sometimes prickling and numbness of the limb down to the tips of the fingers are also experienced. Vertigo, or fainting, is an occasional concomitant. In his general description of the malady Sir Thomas Watson says: "The patient is on the very brink of fainting, nay, does at length faint irrecoverably;" but this expression is, I think, rather apt to mislead. We understand by fainting an arrest of cerebral action owing to a deficient supply of blood to the brain; and in the majority of cases of angina pectoris this does not occur. In many cases the intellect remains unimpaired and quite clear throughout the paroxysm. Moreover, in a certain proportion of cases the disease does not

prove fatal, and therefore the words—"nay, does at length faint irrecoverably," depict it in even darker colours than experience justifies. It seems to me that in nearly all the cases in which the mental functions are disordered during an attack, the nature of the disturbance is much more nearly allied to that characteristic of the short fits of epilepsy than to that of syncope.

The aspect of the patient in the majority of cases is one denoting consciousness of extreme suffering and of extreme danger: he looks terror-stricken, and the spectator is filled with apprehension as to the result of the attack. No person who has once witnessed a severe paroxysm of angina pectoris is likely to forget the fear-inspiring appearance of the patient. The countenance generally becomes suddenly pallid, then gradually turns more or less red, and the features are almost invariably contracted and anxious-looking; the patient thinks he is about to be suffocated; different patients assume different attitudes, that which is least painful being no doubt instinctively chosen in each case. Along with the tingling or numbness, or both, of the upper extremity already mentioned, there is commonly a remarkable disturbance of the circulation visible in the hand and arm as well as in the face. The skin is apt to become excessively pale and cold, and almost immediately afterwards to change to a red, blue, or livid tint. When the attack subsides, a reaction of the local circulation, inducing turgescence, heat, and perspiration, is sometimes observable. Moreover, exceptional cases are recorded, in which one patient thinks his hands swell, another experiences a congestion of the mucous membrane of the nose, another is obliged to micturate, and another had an abundant secretion of intestinal gas during each attack. As a general rule the sense of suffocation which is experienced is not accompanied by any appreciable disorder of respiration. When breathing is interfered with, it usually is so only by the voluntary action of the patient, who fears to breathe lest he should increase his suffering. Paroxysms are prone to occur in the night, and even when the patient is asleep, and in some rare cases they exhibit a regular periodicity like those of ague. In the worst cases they increase in frequency and severity until at length they prove fatal.

The foregoing description fairly represents the chief features of angina pectoris; the phenomena differ, however, exceedingly in different cases, and the disease presents itself in all degrees of intensity. The truth of this remark will be well shown by the two following cases reported by Trousseau:—A gentleman, 60 years old, who had been suffering from diabetes about six years, was also afflicted with angina pectoris, which first attacked him shortly after the sugar was detected in his urine. The paroxysms

recurred about one o'clock each morning, and began with an acute pain in the left arm, and then extended to the chest; it went on increasing progressively for an hour or two, then diminished slowly, and disappeared towards morning. . . . Although the pain was very acute, it did not prevent him from drawing in a deep breath at will, and he had never had a sensation of suffocation. This slow process and decline of the attack, and the absence of the sense of suffocation, are remarkable in this case, while the next is scarcely less remarkable, because while it presented symptoms showing the affinity of the malady with ordinary angina, the patient, a young married lady, had no actual pain during the attacks. For the space of four years she had only excessively violent palpitations, without any sensation in the arm," and then during four subsequent years "the palpitation was accompanied by painless numbness of the left arm, which compelled her to drop whatever she might be holding in her hand. These symptoms recurred whenever she took a little more active exercise than usual."

The age of a sufferer from angina pectoris is rarely less than forty. The disease is especially notable for attacking persons of middle and advanced life. The case of the young lady just mentioned may be fairly adduced as one of those exceptions which tend to prove the general accuracy of this remark; for though her malady exhibited indubitable affinities with angina pectoris, it was not characterised by any of those striking features which especially distinguish that disease, and which, in fact, originated its name.

Men are said to be much more liable than women to attacks of this disorder: of the eighty-eight sufferers, whose cases were collected by Sir John Forbes, only eighty were of the male sex. My experience leads me to doubt, however, whether men are attacked much more frequently than women, and Trousseau says,—“I do not think that it has been proved that males are more subject than females to this singular affection.”

The exciting causes of attacks of angina pectoris are various, and differ in different persons; and when once the disease is really developed, the causes capable of inducing a paroxysm are astonishingly slight. Muscular exertion is one of the most frequent of these causes; the more violent it is, the more likely it is, of course, to produce an attack; but, in some cases, almost any muscular effort will induce it. Walking briskly very often does so, walking up hill or up stairs does so still oftener, and still more often an attack is brought on by walking or running against the wind. In fact, muscular effort of almost any kind will, in some cases, act as an exciting cause. In one case already mentioned walking in the most careful and quiet manner, and in another even the effort of signing a number of documents in

quick succession induced a paroxysm. Mental emotion is especially notorious as an exciting cause. The celebrated John Hunter lost his life, as is well known, by an attack brought on by a fit of anger when he was at St. George's Hospital, where he expired. Indigestion or flatulency not unfrequently produces a paroxysm in some cases; and, indeed, it may be stated, as a general rule, that any cause operating so as to produce disturbance of the nervous system is likely to bring on an attack.

The pathology of angina pectoris has given rise to many ingenious speculations and elaborate hypotheses; and, so far as I am aware, none of the latter are wholly satisfactory. Sir Thos. Watson is of opinion "that the seat of the disease is the heart, or the aorta, and that it consists in some structural change." He discredits the idea that the disorder is a neuralgic affection "because the paroxysm is excited by such causes as are especially calculated to disturb the natural action of the heart, bodily exertion, and mental emotion;" and because "the disease is so very frequently fatal." I confess, however, that these reasons do not seem to me cogent: attacks of undubitable neuralgia are not unfrequently excited by bodily exertion and mental emotion; and the objection that angina pectoris is so often fatal, whereas neuralgia is not, is at once disposed by the consideration that the fatality, or fatality of morbid actions, is mainly dependent on the nature of the function of the organ affected. For example, acute inflammation of the skin is rarely attended with any serious consequences; but inflammation of the mucous membrane of the trachea, in the shape of croup, is very frequently fatal; and, in like manner, a neuralgic, or spasmodic affection of superficial parts, may be unattended with danger, while analogous affections of the viscera, and especially of the heart and aorta, may be remarkably deadly. The theory which seems to commend itself most especially to Sir Thomas Watson, is that which explains the disease "by supposing that the blood, whenever its movement is accelerated by exercise or otherwise, arrives at the heart faster than it can be transmitted onwards, and accumulating in its cavities, painfully distends them." This explanation is incapable of proof, while, on the other hand, certain mighty facts are decidedly opposed to it. A vast number of persons who are extremely prone to strong emotion, and, as a consequence, to sudden disturbances of the circulation and of the heart's action, are never attacked with angina pectoris; again, thousands of persons having notoriously weak hearts, which may be imagined to facilitate functional disturbance, do not have their hearts painfully distended so as to induce the disease in the manner supposed; while, on the contrary, persons with robust hearts do sometimes die of angina pectoris; and in

cases of chloroform inhalation, the right heart is abnormally distended, but I have never heard that those who inhale chloroform evince or experience effects like to those experienced by sufferers from angina pectoris.

Over distension of the heart's cavities is, by other pathologists assumed to be only a preliminary stage in the production of the disorder, such distension being imagined to induce "the immediate cause of the paroxysm," viz., "a sudden impediment to the coronary circulation of the heart, and particularly to the return of the blood to the coronary veins." This theory seems to me untenable because, while like the preceding one, it is incapable of proof—it is open to the fatal objection that *post-mortem* examinations reveal the existence of serious impediments to the coronary circulation in the shape of ossification of, or of atheromatous deposits in the coronary vessels of a great number of persons who never experienced angina pectoris. This objection is held to be a valid one by Dr. Stokes, who regards the disorder as "but the occurrence, in a defined manner, of some of the symptoms connected with a weakened heart." This opinion is directly conveyed by that of Latham, Walshes, and, among continental writers, Bamberger (quoted by Eulenberg), who consider the essential feature of angina pectoris to be a spasm of the heart, or aorta, or of both. The remarks which I have already made at the end of the chapter, on the pathology of neuralgia generally, will have already assured my readers that I look on the opinion of the authorities last quoted as substantially correct. Assuming it to be so, there still remains for consideration the important question,—by what agency is the spasm produced?

Arguing analogically, we are led inevitably to the conclusion that the muscular tissue of the heart and aorta assumes a spasmodic condition only when the nervous energy causing it to contract is morbidly excessive. We know that the heart itself is abundantly innervated—not only by the ganglia imbedded in its own substance, but from various extraneous and complex sources, both cerebro-spinal and sympathetic. The diversity of origin of this powerful nervous influence will probably always render it impossible for us to trace the special source and course in any given case of the morbid nervous force productive of angina pectoris, but it greatly increases the liability of the heart to dynamic disturbance, and affords a complete explanation how it is that the disease in question manifests itself in patients of extremely diverse constitutional conditions, and that its paroxysms are induced by a great variety of exciting causes. The tumultuous forces of violent mental emotions are flashed down the spinal cord, and spreading laterally through the ganglia of the sympathetic cause an instantaneous disturbance

of the otherwise orderly nervous effluence to the heart from the cardiac plexuses; modifications, chiefly by way of acceleration, of the pulmonary circulation, caused by muscular exertion, produce apparently in the predisposed vaso-motor reflex actions on the heart and aorta, and consequently preternatural contraction of those organs; reflex actions of a like kind and producing like effects, may also proceed from the stomach and bowels, or even from the pelvic viscera when disordered; and, *à fortiori*, when the heart itself is diseased, or when aneurism of any of the great vessels in the thoracic cavity exists it is likely that in either the one case or the other the disorder will produce a reflex spasmodic influence directly on the heart or aorta, or on both together. It is therefore easily intelligible how it comes to pass that angina pectoris occurs with especial frequency in cases of ossification of the coronary arteries or of thoracic aneurism, although neither of those structural injuries is necessarily either an efficient or exciting cause of the malady. In short, the paroxysms of angina pectoris like those of epilepsy can only occur through the intervention of the nervous centres, and the exciting causes of the one disease as of the other can only operate through the agency of those centres. Moreover, I apprehend that just as there are cases of epilepsy which, having no assignable cause, are called idiopathic, so there are probably many cases of angina pectoris, the essential nature of which consists in an inherent constitutional predisposition to the malady existing aboriginally in the nervous system, and expressing itself whenever that system is especially irritated or excited by causes of any kind operative primarily in any part of the body.

I venture to believe that this view of the nature and genesis of angina pectoris will commend itself by virtue of its simplicity and vraisemblance to the majority of pathologists, and that on further examination it will be found to afford the only satisfactory explanation of the several morbid phenomena above mentioned as associated with the principal disease.—*Medical Mirror*, Sept. 1, 1870, p. 169.

DISEASES OF THE ORGANS OF RESPIRATION.

35.—A CLINICAL LECTURE ON PNEUMONIA.

By Dr. GEORGE JOHNSON, Physician to King's College Hospital.

We have recently had in the hospital a succession of cases of pneumonia. I purpose to give you now a condensed history

of one typical case, and to make it the subject of some physiological and practical comments.

R. W., aged 53, cellarman to a wine merchant. Has drunk rather freely, but less so since he lost his wife six months ago.

On June 11, while at work, he felt giddy. This was followed by a sensation of cold, and he had a violent attack of shivering. He went home, and in the evening he had a sudden fit, during which, his daughter says, he was quite unconscious, and foamed at the mouth, but his limbs were not convulsed. (?) The foaming at the mouth continued for about a quarter of an hour, and he remained unconscious for about twelve hours. When he recovered his consciousness he was delirious, and continued so until his admission into the hospital on June 14th—that is, three days from the commencement of his illness. Here it may be well to mention that, for three days before his illness, he had been working in a cellar which was very cold and damp, in consequence of its walls being covered by fresh cement.

On the 15th it was noted that he was delirious, and talked incessantly during his sleep. The skin was hot; temperature 103° ; pulse 104; respiration not noted. He had cough with rust-coloured expectoration. There was dulness on percussion; bronchial breathing and bronchophony over the lower lobe of the right lung. The urine was high-coloured, and contained one-fifth albumen.

On the 16th the temperature had risen to 104.2° ; pulse 112. He was perspiring, and still delirious. Physical signs the same. The urine less albuminous—one-sixth.

On the 18th the temperature had fallen to 99.2° ; pulse 80. Return crepitation over the right lower lobe. As he continued restless and delirious, he was ordered to take twenty grains of chloral-hydrate every four hours.

On the 20th it was noted that he had slept better; and was much less delirious; crepitation and a creaking friction sound over the right base; temperature 100.6° ; pulse 92. To take the chloral three times a-day.

On the 22nd slept well; continues to improve; no albumen in the urine.

On the 24th the chloral was omitted, and he was ordered to take a quinine and acid mixture. The signs of lung consolidation were passing away, but the friction sound was still audible.

On the 27th the friction sound had ceased, the temperature was normal, and he was convalescent.

It may be well to mention that until the chloral was prescribed he took no medicine. On his admission he had two ounces of brandy in the twenty-four hours; this was increased

to six ounces on the 17th, and again reduced to four ounces on the 22nd. His diet was milk, beef tea, and eggs.

Now, let us consider briefly the physiological rationale of the symptoms in this case.

I look upon it that before there was any local mischief in the lung, there was blood-poisoning. The precise nature of the blood-poisoning is doubtful, but it may probably have been due to suppressed action of the skin, consequent on the chilling effect of working in a damp cellar. The evidence of blood-poisoning consists in the occurrence of rigors, followed by an epileptic seizure, and this again by delirium. Rigors are probably a result of interrupted circulation through the spinal cord, and the immediate cause of epilepsy is a similar interrupted circulation through the brain. To some extent, perhaps, the delirium was a result of his somewhat intemperate habits—it may have been a form of delirium tremens. Another fact which points to blood-poisoning is the occurrence of temporary albuminuria. Again, the high temperature was probably associated with a morbid process in the blood.

One of the most important results of this blood contamination was the exudation into the lung, the pleuro-pneumonia. Then there quickly followed a fall of temperature.

I have frequently pointed out to you a similar sequence of events in cases of pneumonia, and I have shown you that the exudation into the lung is speedily followed by subsidence of the febrile excitement. The exudation into the lung may be looked upon as analogous to the eruption on the skin in a case of small-pox. In both diseases, *i.e.* pneumonia and small-pox, a noxious product is thrown out of the circulation, in one case into the lung, in the other into the skin. In both diseases the appearance of the local symptoms is quickly followed by a fall of temperature and a diminution of the general febrile excitement. The structural changes in the lung and in the skin respectively, give rise to a fresh class of symptoms, and may in various ways cause distress and endanger life.

Now I have a practical object in directing your attention to what I venture to call the physiology of pneumonia which is not of traumatic origin. A right appreciation of the disease may enable you to prevent or to greatly mitigate the pulmonary symptoms. If we can catch the disease in the stage of the initiatory fever before the exudation process has commenced, I believe it is possible to prevent the pulmonary mischief by favouring exudation through other channels. In a large proportion of cases the exciting cause of pneumonia is suppressed action of the skin by a chill or other unknown atmospheric influence, and the main object of treatment should be as early as possible to restore the free action of the skin. This may be

done in various ways—by a warm-water or hot-air bath, by packing in a wet sheet and blankets, and by the diaphoretic action of repeated small doses of antimony or ipecacuanha, with or without opium. This diaphoretic treatment is often successful in arresting a catarrh, and it may be equally successful in preventing or mitigating pneumonic exudation.

You will observe that vomiting and diarrhoea are amongst the symptoms which occur not unfrequently at the commencement of a febrile attack, which results soon in inflammatory consolidation of the lung. We may take a hint from these phenomena, and assist in diverting mischief from the lung by an emetic or by a purgative dose of calomel and colocynth, followed by a saline.

The success of this abortive treatment of pneumonia depends mainly upon its early application. It is too late to attempt prevention when the lung tissue is already consolidated by inflammatory exudation. But inasmuch as before the occurrence of the pulmonary symptoms the precise nature of the disease must be uncertain, the beneficial results of the treatment will remain doubtful in proportion to the completeness of its success. When the lung tissue has become consolidated by exudation there is no need for active treatment. Expectoration and absorption will in most cases more or less rapidly restore the lung to its normal condition. Pleuritic pain, when present, may be relieved by warm fomentations or poultices, or if severe by the application of three or four leeches. With reference to the pain of pleuro-pneumonia, let me give you one practical hint. The pain may be sharp at the onset of the disease, it may subside entirely when the lung is consolidated, and it may return with some severity when the physical signs indicate that the lung consolidation is passing away. The explanation I believe to be this:—The pleurisy which complicates pneumonia is almost always dry pleurisy; there is lymph on the pleura covering the inflamed lung, but there is little or no serous effusion. The friction of the inflamed and roughened pleural surfaces increases the pain, the consolidation of the lung lessens lung and chest movement, thus friction and pain cease, to return when, with the passing away of the pulmonary consolidation, the lung and chest movements again become free.

You will often observe that with a return of the pleuritic pain there is a return of the friction sound, which may have been audible during the early stage of pulmonary engorgement, but not during the stage of hepatisation. In the case which I have just now read to you the friction sound was heard for the first time when the redux crepitation indicated that the lung consolidation was diminishing. Do not fall into the error of supposing that the redux pain and friction sound indicate a

fresh attack of pleuritic inflammation. Lastly, let me say that the case to which I have referred is one of many in which the hydrate of chloral has had a most beneficial influence in allaying delirious excitement and procuring sleep, without in any way impeding expectoration or the healing process in the lung.—*Medical Times and Gazette*, Aug. 6, 1870, p. 145.

36.—ON INFLUENZA.

By Dr. C. HANDFIELD JONES, F.R.S., Physician to St. Mary's Hospital.

Too many are inclined, I fancy, to look upon influenza as essentially a bronchial catarrh; but I quite agree with Graves and Blakiston that its cause acts in a special manner on the nervous system, and that it is no mere inflammation. The peculiar prostration, the headache and other nervous symptoms, which are not unfrequent, differentiate it markedly; besides the suddenness of invasion, which it often very remarkable. I will narrate a case briefly to you which illustrates these points well. T. P., aged 32, had been in hospital three weeks under my care for epididymitis, and was nearly well, when he was taken one morning, about 10.30, with severe headache, prostration, and fever. His pulse was very weak, 135, and his temperature 106·5, the same afternoon. There was some deficiency of breathing at the right posterior base, but no marked dulness or crepitation. The lungs continued free; the temperature and pulse soon declined to a lower, though still febrile rate; but his brain remained seriously enfeebled for more than a fortnight after his seizure, and he convalesced very slowly. Giddiness and prostration of mental activity were the most remarkable phenomena. Ten days after his seizure, he staggered and fell down when he got out of bed; and, a week later, he was so torpid and silent that I had some difficulty in getting him to answer questions. His pulse and temperature had, however, become natural, except that the former was very feeble. Here it was manifest that the stress of the disease fell altogether on the encephalon, and that the lungs were very slightly affected. In our first case, it was much the same, though there seems to have been a greater amount of catarrh.

Another instance worth mentioning is that of a middle-aged lady who had very great prostration of brain-power, so that she could scarcely attend to her household matters. Strychnia did her great good. Her husband at the same time had severe catarrh, coughed violently in the early morning, and sweated so copiously at night that he had to change his night-shirt.

It is hardly an hypothesis to say, that in the first of these

cases the hemispheres, and in the second the vaso-motor nerves, were almost solely affected. The lady remarked to me, that she supposed she had "suppressed catarrh."

The peculiar jarring sensation throughout his body which our patient experienced can only be regarded, I believe, as a modification of cerebral derangement, dependent perhaps on special implication of the sensory nerve nuclei. That, under certain circumstances, the normally insensitive hemispheres may become the seat of pain, I can hardly doubt. A man, aged 70, consulted me once, complaining of a "soreness of the brain"; any motion or coughing jarred and hurt his head, or rather its contents. His head, however, was not tender to tapping. He had no rheumatism; no syphilis; no paralysis. His intellect was clear; but he had sensations of things crawling about the low part of his forehead. The age of this patient would make one suspect calcification of the cerebral arteries; and this might occasion the symptoms complained of. However this may be, there can be little question that, owing to some defect in nutrition, the cerebral nerve-tissue became intolerant of slight commotions which ordinarily it could have endured very well.

But to return to our patient: I do not think the peculiar dysæsthesia of which he complained—the jarring sensation—was of any special significance. No doubt some minute modification of molecular arrangement corresponds to each of the manifold dysæsthesiæ which such sufferers experience; but these are far beyond our ken, and it is not of any vital importance to the practitioner to be acquainted with them. The subjective phenomena (the same is true of the objective) are no sure guide to the *quality* of the disorder; and this is what especially concerns us. You will never treat derangements of the nervous system successfully, if you suppose that all phenomena having the same outward appearance are really alike. Cases of delirium, of spasm, of neuralgia, differ very greatly, though, as far as phenomena go, they are identical. In the case of H. G., I was led into error at first by the history and by the evident signs of prostration of nerve-power. These led me to give tonics and stimulants, which availed nothing for the relief of his head. When, however, I administered an unexciting calmative, aided by a counterirritant (for such I consider the sternutatory), improvement ensued rapidly. You may perhaps think that such a remedy ought, on rational grounds, to have been employed at once; and that stimulants were inappropriate to the symptom *pain*. A little experience, however, will show you that, in a multitude of instances in which debility constitutes a prominent feature, stimulants are most efficacious sedatives. Two or three glasses of port wine will remove, for the time, neuralgia in

some cases. All neuralgic pain, however, is not to be thus dealt with; and you may need, to allay it, remedies which are very much the reverse of stimulants, such as hydrocyanic acid, bromide of potassium, aconite, and moist warmth. When I find such means as these successful, I think the condition is thereby at once differentiated from that in which our ordinary tonics avail; just as much as two different saline solutions are distinguished by chemical tests.

As I have above said, I cannot tell you in what the essential difference consists; but I find it of value to keep in my own mind the two conditions separate, and to denote them by some such terms as neuralgia and hyperæsthesia. It may aid us in forming more definite conceptions of these two states, if we call to mind their analogues among motor disorders, such as choreal paralysis and jactitation, which, though extremely unlike, undoubtedly originate in the same morbid process, and are, so to speak, truly homogeneous. It is a fact, that all causes which impair strength are very prone to generate hyperexcitability, which may show itself in the sensory, or motor, or intellectual departments.

Lastly, as to the sternutatory. This must be regarded as a form of counterirritation; having this advantage, however, that it is capable of repeated application within a short time; and that it provokes repeated diversions of blood, with mucous exudation. The formula which I employed is that recommended by Dr. Laycock; and you see that it was very positively more efficacious than common snuff. Its good effect in our patient depended, I think, on its producing reflex stimulation of the vaso-motor nerves of the cerebral arteries, and lessening the blood-flow, which was probably excessive for the *weakened* tissue. I emphasise the word *weakened*; for I hold it well ascertained, that an organ whose vitality is vigorous can bear and employ beneficially a much larger supply of blood than one which is in an opposite state. The nerves of the Schneiderian membrane are perhaps better fitted than any to exert this constringing influence. At the same time that the sensory nerves of this membrane are excited, its vaso-motor are, in all probability, relaxed; so that the vessels become suddenly congested, and modified blood-fluid and corpuscles escape. This seems to be the general rule in all localities, that tissue-excitement determines vasal relaxation. Fatal cases of tetanus and chorea afford marked examples; the vessels of the cord or other nervous centres being engorged, and rupture and extravasation having ensued in some places. To an hyperexcitable organ, an undue amount of blood-flow is certainly injurious; so that it is good practice to try to calm tissue-excitement while we constrict vessels.

I do not know that I can altogether explain the mode of action of counterirritants; but their utility, in spite of recent scepticism, I do not doubt; and I strongly advise you not to doubt.

To conclude, let me counsel you to familiarise your minds with such common things as the management of headache in its various forms. Many of you may never perform lithotomy, nor perhaps amputate; yet students crowd to gaze at the great operations, of which they can see next to nothing, and which they are little likely ever to perform; while they can hardly be brought to give a thought to the treatment of a malady which they may have to deal with any day of their lives.—*British Med. Journal*, July 23, 1870, p. 81.

37.—SUBCUTANEOUS PNEUMATIC ASPIRATOR.

Under this title Messrs. Weiss and Son have introduced to the profession a new instrument, invented and patented by Dr. Georges Dieulafoy, of Paris, which promises to be of great practical value.

It consists of a glass exhausting syringe, capable of being attached to a fine tubular exploring needle, or to a canula of larger size. The syringe being first exhausted, and its piston secured by a half-turn, which engages the notch in a catch, an exploring needle is introduced at any point beneath which the presence of liquid is suspected, and is carried to a sufficient depth to prevent air from entering at its point. The exhausted syringe is then connected with the needle, either directly or by the intermediation of an elastic tube; and a stopcock between the channel of the needle and the vacuum is opened. The needle is then carried onwards, and as soon as its point reaches fluid this fluid rushes into the vacuum. By closing the stopcock and opening a lateral one, the fluid can be driven out into a vessel by disengaging and pushing down the piston; and by drawing up the piston when both cocks are closed the vacuum is restored, and will be again filled by fluid as soon as the communication is reopened, and as long as there is any left to flow. In this way, according to the inventor, fluid may be discovered at any depth, and removed without risk from any situation. He has operated upon joints, the pleura, deep abscesses, and even the head in cases of hydrocephalus, and in many cases with great advantage.—*Lancet*, May 28, 1870, p. 773.

DISEASES OF THE ORGANS OF DIGESTION.

38.—ON THE USE OF ARSENIC IN CERTAIN PAINFUL AFFECTIONS OF THE STOMACH AND BOWELS.

By Dr. ARTHUR LEARED, Senior Physician to the Great Northern Hospital.

Pain after food is a very common symptom of dyspepsia, and in many cases seems to constitute the disease. This pain usually yields to medical treatment and proper diet. But there is another kind of gastric pain far more severe than that which depends on food, and which does not yield to ordinary remedies. I have elsewhere pointed out how this pain may be removed, and the subject seems of sufficient importance for some further remarks. [Vide *British Medical Journal*, Nov. 23 and 30, 1867, and "*Retrospect*," vol. lvii, p. 92.]

In case of the stomach, the pain we have to deal with happens to the same individual at one time when it is full, at another time when it is empty. But cases are met with in which the presence of food in the stomach is clearly the exciting cause. The typical case is that in which there is pain independent of the act of digestion. In this form it commonly seizes the patient in the middle of the night, and is not preceded or attended by any dyspeptic symptoms. The pain in these instances, which are fortunately not very common, is extremely severe, and attended with alarming prostration, lowering of the heart's action, pallor, and cold perspiration. Brandy and other stimulants give but little relief, and after a period of agony sometimes extending to several hours, the attack ceases as suddenly as it had commenced.

Persons of middle age who have been exposed to some great cause of mental depression are peculiarly the subjects of this affection of the empty stomach. Dr. Budd has also noticed mental disturbance as an exciting cause of the disorder, and he adds that "it is closely allied to water-brash." In this statement I do not concur, for without entering into the vexed question of the nature of water-brash, it is sufficient to say that a particular remedy which cures the one proves injurious to the other.

Further experience has taught me that the bowels, and especially the small intestines, are subject to the same kind of pain. I do not include colic from the effects of lead; but many cases of so-called colic unaccountably occurring at longer or shorter intervals are from the same cause. For whether the pain attacks the stomach or the intestines, its nature is the same; it is essen-

tially neuralgic. Upon this circumstance the success of the new treatment, which consists in the judicious exhibition of arsenic depends. As may be inferred from what has been stated, the difficulty of diagnosis between the neuralgic and the more common forms of gastro-intestinal pain is sometimes very great. The best rule of practice is, when gastric or intestinal pain resists all ordinary treatment, and cannot be traced to gall-stones or any organic source, to test the matter by the effect or non-effect upon it of the remedy. By this method I have succeeded in effecting several cures. On the other hand, the arsenical treatment has failed in two cases in which, so far as the diagnosis could be established, it ought to have succeeded. In both instances the patients were women past middle age, of stout habit, and too freely addicted to the use of alcoholic stimulants.

The curative effects of arsenic are most striking in severe cases of paroxysmal pain, and its success becomes doubtful in proportion as the case assimilates to those in which a lower degree of pain is traceable to the influence of food. In determining the question of the fitness of a case for the arsenical treatment certain circumstances may render essential aid. If the disease came on after some mental shock or severe trial, if the patient has previously unmistakeably suffered from neuralgia, if he has lived in a marshy district, and especially if he has had hemicrania or ague, and if in addition to the occurrence of one or more of these circumstances the pain is paroxysmal, it will almost certainly yield to arsenic. But as already said there are other cases suitable for the treatment, and they are the most numerous, in which the pain closely resembles that which attends dyspepsia. It is sometimes extremely difficult to make the diagnosis between neuralgic pain of the stomach or bowels and the pain caused by gall-stones. But in my previous paper I have gone into details respecting this and other sources of error.

A few words will suffice as to the particular preparation of arsenic to be selected, and the extent to which it should be used. In most cases the liquor arsenicalis answers every purpose, but when the system is more than usually susceptible of the action of the mineral the liquor sodæ arseniatis seems to irritate less, and in a few instances the acid solution of arsenic is to be preferred to either. Whatever preparation be selected it should always be taken immediately after food, and, notwithstanding that its beneficial action may have been previously observed it will be proper to continue the medicine until its constitutional effects are well marked. Notwithstanding what has been said to the contrary I do not believe that the proper

use of arsenic as a medicine is followed by any injury to the system.

The following brief notes illustrate the utility of the treatment in cases in which the pain is increased by food, and also its effect in cases in which the intestines are affected:—A lady, 40 years of age, who had met with a reverse of fortune by the death of her husband two years previously, was sent to me by her medical attendant in January, 1869. I was informed by him that every ordinary means, including a milk and farinaceous diet, with entire abstinence from meat for eight months, had been exhausted in his attempts to relieve her sufferings. These consisted in constant pain in the gastric region, extending round the left side to the centre of the back. The pain was much aggravated by meals, especially by breakfast and tea, and at times it amounted to perfect agony. Vomiting frequently ensued, and then some relief of the pain was obtained. There was great flatulence, a sense of oppression in the stomach, and obstinate constipation. The patient, naturally of stout habit, had lost over 50 lbs. in weight. She was immediately put on the arsenical treatment, which was speedily followed by great improvement. The treatment was continued, and the dose gradually increased until the constitutional symptoms, which consisted in this instance of itching of the eyes, soreness of the soles of feet with a red rash upon their sides, ensued. By this time her cure may be said to have been complete; she rapidly gained flesh and strength, and has since remained well.

The symptoms in this case resembled those of ulcer of the stomach, but the fact that a rigid milk and farinaceous diet increased rather than diminished them was opposed to this view.

A gentleman, 28 years of age, much engaged in commercial speculations, consulted me in the early part of the present year. He had been for a long period subject to a violent but dull pain in the umbilical region, coming on about two hours after meals. For the three previous weeks it had happened daily after breakfast, luncheon, and dinner. Liquids, even plain water, induced it more than solids. There was neither flatulence nor any other stomach disturbance, and the bowels were quite regular. Various plans of treatment had been found ineffectual. He had suffered from neuralgia in the left temple two years previously. Notable relief was afforded by the liquor arsenicalis after it had been taken only two days; it was continued altogether for about three week, when his eyes became affected. At this time the disease had quite subsided.—*Medical Times and Gazette*, July 23, 1870, p. 94.

39.—ILEUS TREATED BY ELECTRICITY.

By the CHEVALIER Dr. MACARIO, Nice.

[The patient was a man of 71, the subject of obstinate constipation. He was in the habit of using large and repeated enemas. On the morning of the 26th of February he actually had six enemas, the two last of which only were retained. After this he was seized with violent pains, vomiting, and suppression of both urinary and alvine evacuations.]

When I arrived the first symptoms had appeared twenty-eight hours, the patient was plunged into a species of drowsiness from which he was roused every fifteen minutes by abdominal pains, followed by vomiting. There was no fever, but the pulse was very small, the abdomen tympanitic, and the intestinal circumvolutions delineated on the abdominal walls. There were hiccough and stercoracious vomiting in my presence. I explored the abdomen carefully, but found no hernia. In the presence of so serious a case, I suggested a trial of electricity. Consequently I procured the apparatus of Gaefte for the induction of volta-faradic currents, and proceeded immediately to the operation. I introduced into the rectum a metallic conductor, which I then connected with the positive pole, then the negative pole, alternately moving the other furnished with wet sponge over the abdomen in the region of the transverse colon particularly, where was the seat of pain. I used at first the full strength of the electric current. Under its influence the abdominal walls contracted with violence, rising like an agitated sea. The patient complained very much. The operation was continued ten minutes: immediately after it, the pain in form of a bar vanished away, the vomiting ceased, the general state mended, and the patient felt much better. I suspended the electricity, and waited for the evacuations. The calm kept up, and the vomiting did not appear any more; in the evening, four hours after the operation, a first copious evacuation appeared spontaneously, which was followed by several others in the course of the night, and the day following the patient was cured entirely. He was delighted at having escaped a great danger. I do not know if electricity has been employed in like cases, but I am persuaded that this case will interest the profession.—*Medical Press and Circular*, June 15, 1870, p. 469.

40.—ON THE USE OF RAW MEAT IN DIARRHŒA AND DYSPEPSIA.

By Dr. ROBERT DRUITT, London.

I learned the use of raw meat as a remedy for diarrhœa, from the late estimable Professor Trousseau, during a visit paid to

his clinique at the Hopital des Enfants Malades in 1851. Since that time I have had abundant opportunities of proving its efficacy, and although I know that it is largely used by some physicians, it may not be unseasonable at the present time to call attention to it, and to encourage its more general use.

Let me begin with a few words on the mode of preparing it. The meat used may be either mutton or beef—say a tit-bit of the loin of mutton, or of the fillet or other tender part of beef. This must be submitted to a process either of pounding, or of scraping, so as to get out the red soft muscular substance, as free as possible from all fat and fibre. The muscular substance so prepared forms a soft pink pulp, and even a good-sized piece of raw meat seems to yield wonderfully little by comparison with the parts that are rejected. It must be a pulp, giving no feeling of resistance when squeezed between the fingers.

The modes of administration are many. It may be given by itself, and this way is best in the case of young children. Very young infants may suck it from the end of their nurse's finger, and most of them take it greedily enough in this way. Children who are older, say from two to five, may swallow it if dusted over with white sugar. Older persons may take it conveniently if diffused through a little strong beef-tea. But there is another way for which I am indebted to a lady who has made very large use of this remedy in the case of her invalid daughters, and which is known amongst a pretty wide circle as a *jellied chop*. This consists in diffusing the meat pulp through a stiff meat jelly, and allowing it to cool in a shape. This is eaten like a spice, and is very nice to any one whose prejudices are not aroused by the notion of rawness. Salt and other condiments may be added at discretion.

The cases in which raw meat has peculiar efficacy, are those in which other food passes undigested, and adds to the irritation of bowels in a state of diarrhoea. It seems to furnish the most efficient kind of nutriment with least inconvenience from bulk or other quality, and to be digested and absorbed with as little faecal residuum as possible. Still there must be something more about it than this; for the liquid essence of beef will not take its place, neither will cooked meat.

First amongst the cases in which it is useful may be mentioned any acute cases of infantile diarrhoea, especially the infantile "cholera" of summer. No matter what medicines and what other kind of food may be used, I believe raw meat to be in itself both a remedy for the diarrhoea and a nutriment that may keep the child alive till the disease passes off.

Secondly, in the chronic diarrhoeas of children, arising from scanty food, or what comes to the same thing, food which cannot be digested, and which consequently passes the bowels as a

foreign offending substance, here the raw meat acts as food and medicine.

In the habitual diarrhœa associated with “marasmus”—that is, with the superficial ulceration of the intestinal mucous membrane, and the enlarged mesenteric glands of strumous children—the raw meat, especially in the form of the “jellied chop,” is of most especial service. It is curious to see in cases of this sort how absolutely the stomach sometimes refuses to act upon the food put into it, so that meat, milk, &c., may be recognised unaltered in the fæces. It is just in these cases that the raw meat shows itself susceptible of quick digestion in the stomach. The cases which the ancients called *lienteria* or *intestinorum lævitas*, and which were designated in England in the last century “lubricity of the intestines,” in which stomach and bowels are so irritable that they pass on and eject the food before it has had time to be dissolved and absorbed—are equally benefited by the use of raw meat.

Lastly, there are the cases of the obstinate vomiting of pregnancy, whether attended with diarrhœa or not. This is a kind of case in which no remedy is unwelcome or superfluous. I cannot take to myself the credit of suggesting it, for the mother of a young pregnant lady who was in imminent danger of exhaustion from vomiting had witnessed the good effects of this food in the case of another daughter who died of ulceration of the intestines, and gave it of her own accord. But I can bear testimony to the fact that the raw meat was taken readily and kept down when almost every other food was loathed and vomited, and I consider the patient’s safety largely due to it.

There are other cases of atropy, dyspepsia, and malnutrition in which I have found it useful. I should like also to say a few words on some other uses of meat, cooked as well as raw; but at present I wish mainly to call the attention of my medical brethren to its efficacy in diarrhœa, which may be expected to be the cause of an abundant mortality of infants during the next two months.—*Med. Times and Gazette*, July 2, 1870, p. 4.

41.—THE LIVER THE SEAT OF FORMATION OF UREA.

The latest researches upon the place of origin of urea, and especially the beautiful experiments of M. Gréhan, have demonstrated that the kidneys are by no means secretory, but purely excretory, organs for urea. Dr. Cyon, in the last number of the *Centralblatt* publishes a few facts in the form of a provisional communication, to show that it is probably produced at the liver. The plan of experimentation adopted (in common with M. Istomin) was as follows: The whole of the blood was abstracted from the carotid of a dog, and a portion,

after being defibrinated, was transmitted by means of mercurial pressure through the liver. Coincidentally three canulæ were introduced—one into the inferior vena cava, the second into the hepatic artery, and the third into the vena porta. The results of careful analysis showed that the blood which had passed through the liver contained a much larger proportion of urea than ordinary arterial blood. In one experiment 100 c. c. of the arterial blood when defibrinated contained 0·08 grammes of urea; but after having been passed four times through the liver, the same quantity contained 0·176 grammes.—*Lancet*, Oct. 1, 1870, p. 478.

DISEASES OF THE URINARY ORGANS.

42.—ON THE TREATMENT OF ACUTE AND CHRONIC BRIGHT'S DISEASE.

By Dr. GEORGE JOHNSON, Physician to King's College Hospital;
Professor of Medicine in King's College.

[The term Bright's disease is nearly but not quite synonymous with renal albuminuria. The principles which should regulate our treatment of the disease are pretty well known, but anything from so good an authority on the subject as Dr. Johnson cannot but be worth study.]

The causes of renal albuminuria arrange themselves in two main divisions.

1. A mechanical impediment to the escape of the venous blood from the kidney, as from disease of the heart or lungs; the pressure of dropsical fluid in the abdomen; sometimes probably the pressure of the gravid uterus.

2. An abnormal condition of the blood is by far the most frequent cause of albuminuria. Thus albuminuria occurs not infrequently as a result of scarlatina, diphtheria, erysipelas, typhus and enteric fever, pyæmia, cholera, measles, purpura, gout, &c. The albuminuria which sometimes occurs during the early stage of pregnancy is probably a consequence of blood-changes associated with that condition; while that which occasionally follows parturition is, in all likelihood, a result of absorption of septic materials from the uterus.

Thus albuminuria may result from a primary mechanical hindrance to the movement of blood, or from a primary change in the quality of the blood. On the present occasion I shall exclude from consideration that class of cases in which albuminuria is a result of a mechanical impediment to the circulation and consequent passive congestion of the kidney. My

remarks will have reference only to the more numerous second class of cases—cases of albuminuria the result of abnormal states of blood. I shall endeavour to make my remarks as practical as possible, with only so much of reference to pathological theory as may serve to guide or to explain practice.

The extreme frequency of renal disease is a physiological result of the kidney forming one of the main channels by which effete and noxious materials are cast out of the circulation. During the process of excretion, the kidney-tissues—primarily the gland-cells, secondarily the blood-vessels—undergo structural change. A leading principle of treatment is to lessen as much as possible the excretory work of the kidney, more especially in cases of acute Bright's disease. The main points are—rest in bed in a room of moderate uniform temperature; a carefully regulated and a somewhat scanty diet; the adoption of means to promote a free action of the skin and bowels.

In all cases of acute Bright's disease, rest in bed is an essential part of the treatment. In a large proportion of cases, this with a scanty diet will suffice for the cure. The diet may consist of milk alone if it suits the patient's stomach, or milk with an egg or two in the course of the day, or with the addition of beef-tea or other animal broth. Under this regimen the urine soon becomes copious, while the albumen diminishes and gradually disappears.

The copious flow of urine which usually occurs during convalescence from acute Bright's disease is thus explained. During the acute and congestive stage of the renal disease, the constituents of the urine—both solids and liquids—have accumulated in the blood, and have thence been effused into the areolar tissue and into the serous cavities. Now, urea is a most powerful diuretic. When injected into the veins of a dog, it quickly excites a copious flow of urine; and no sooner is the inflammatory congestion of the kidney removed, and thus the freedom of the renal circulation restored, than the urea retained in the blood begins to exert its natural diuretic action upon the kidney. The copious flow of urine thus induced speedily removes the accumulated urinary solids and water from the blood, the areolar tissue, and the serous cavities, into which they have been effused, and thus the dropsy is cured.

This abundant flow of urine occurs without aid from diuretics or drugs of any kind. I have seen it occur while a bread-pill or coloured water was given as a placebo. Stimulating diuretics such as squills, or cantharides, or turpentine, would be injurious, by increasing congestion of the kidney. The best diuretics in such cases are those means which tend to lessen renal congestion—dry cupping or hot fomentations over the loins, hot-air or water baths, purgatives, and a scanty diet, with a free use of

diluent drinks—one of the best and pleasantest drinks being the “imperial drink,” made with cream-of-tartar and lemon.

When the renal congestion is extreme, as shown by the scanty secretion of highly albuminous urine, local bleeding by leeches or cupping on the loins is often extremely useful. If by the abstraction of a few ounces of blood from the loins we relieve the renal congestion, we shall check the rapid destruction of blood constituents which results from uræmia; moderate local bleeding, therefore, tends to economise blood, and to prevent its waste.

It has been asserted that cupping or leeching the loins can help an inflamed kidney no more “than if the blood had been taken from the arm or from the nape of the neck.” But this, surely, is a mistake. The lumbar arteries, which supply the integuments of the loins, arise from the abdominal aorta, close by the origin of the renal arteries; and when leeches or cupping-glasses draw blood through the skin of the back, it is certain that the diminished pressure within the lumbar arteries will divert a certain quantity of blood from the neighbouring renal arteries. The same principle explains the good effects of leeching in cases of pericarditis. The internal mammary artery sends deep branches to the pericardium, and superficial branches to the intercostal spaces and the skin. By the application of leeches over the heart, we abstract blood from the integumentary branches of the internal mammary artery, and thus divert a portion of blood from the deeper pericardial branches. The blood will as surely take the course indicated by diminished pressure within the vessels as the water in a pump will, up to a certain height, follow the rising piston. It may be thought that the quantity of blood thus diverted is very small: so, in the case of venesection being practised in the arm or neck, how scanty is the stream of blood which escapes from the opening in the vein compared with the torrents of blood rushing through the venæ cavæ into the right side of the heart; and yet in a case of obstructed circulation through the heart or lungs, how promptly and decidedly does this small diverted current lessen the distension of the whole venous system. Hot fomentations or poultices on the loins act by relaxing the superficial arteries. The skin, therefore, receives a larger supply of blood, and thus a portion of blood is diverted from the renal arteries. Then, too, there is some degree of depletion from the full cutaneous capillaries by the free local sweating which the warmth occasions.

Dry cupping acts in a somewhat similar way to hot fomentations. It draws an abundance of blood through the arteries into the subcutaneous capillaries, which, when the cups are removed, returns through the veins to the heart. In order that dry cupping may be most effectual, each cup should be removed

as soon as the vessels beneath are well filled, and then it should be reapplied. The object is first to draw the blood through the arteries into the capillaries; then to allow it quickly to return by the veins, and not to keep it stagnating in the capillaries. which will happen if the glass be retained long on one spot, Another point is not to draw the blood into the skin with sufficient force to cause extravasation, the effect of which will be to impede the circulation through the skin, and so to divert more blood into the inflamed tissues beneath. The sole object of dry cupping, be it remembered, is not to irritate the skin, but to draw blood rapidly from the arteries, and as rapidly to transmit it through the capillaries to the veins, in its backward course to the heart.

As a rule, it is well to give no alcoholic stimulants; or, if need be, to give them very sparingly in cases of acute Bright's disease. The imbibition of alcohol imposes extra work upon the kidney, and so is opposed to the principle of lessening as much as possible the work of the inflamed gland. Excess of alcohol is a not infrequent cause of albuminuria; and a very moderate employment of alcohol may tend to perpetuate and aggravate disease.

Not long since, a man was admitted into King's College Hospital completely narcotised by a surfeit of wine, which was pumped from his stomach in large quantities. The urine drawn off from the bladder contained a large amount of albumen. In a few hours the man recovered consciousness, and the urine became normal. The temporary albuminuria was a result of renal congestion while the excess of alcohol was being excreted by the kidneys.

When acute Bright's disease is making satisfactory progress towards recovery, the dropsy usually disappears for a variable time before the urine ceases to be albuminous. It is very important to impress upon the patient that until the urine has regained its normal characters, he must be extremely careful to avoid cold, fatigue, and errors of diet.

The duration of albuminuria in cases that ultimately recover is very variable. I have seen many cases of recovery, after the disease had continued for from three to twelve months; and I have seen some recover after the urine had been albuminous for one, two, three, and in one case four, years.

The more I have seen of the disease, the more hopeful I have become as to the ultimate result, when the history and the symptoms, and above all, the chemical and microscopical characters of the urine, do not indicate extensive and irremediable degeneration of the kidney. In all the cases of recovery from long-continued albuminuria, the preparations of iron have entered largely into the medicinal treatment of the disease, and

have apparently contributed much to the favourable result. There are two preparations which I believe to be especially useful: these are the tincture of the perchloride and the syrup of the phosphate. I believe that they are best taken with the food. I have frequently combined with each dose of the perchloride of iron ten grains of hydrochlorate of ammonia; and I believe that this ammonio-chloride of iron is a useful combination.

Amongst other remedial agencies, when acute renal disease is prolonged and threatens to become chronic, change of air and scene is often highly beneficial; and I have seen some most remarkable recoveries effected under the influence of a long sea voyage.

There are few diseases which, during their progress, cause more varied and severe suffering than confirmed chronic Bright's disease in its various forms. As the symptoms vary in the different forms of chronic renal disease, so a varied treatment is required in the different classes of cases. Without entering into minute pathological distinctions, for which we have now no time, I purpose to say a few words on the treatment of some of the more frequent and distressing symptoms.

In one class of cases—cases of large white kidney, with a scanty secretion of highly albuminous urine—dropsy is usually a prominent symptom. The tendency to dropsy is without doubt increased by the dry and inactive state of the skin; and this condition of skin seems to be mainly due to the hypertrophy of the muscular walls of the minute subcutaneous arteries. This excessive muscularity of the small arteries enables them to resist the relaxing effect of external warmth, so that a hot-air bath often fails to excite diaphoresis. Patients who do not perspire under the influence of a hot-air bath, usually complain of painful throbbing in the head, difficulty of breathing, and other distressing sensations. So frequently is this the case, that in cases of chronic renal disease I am now in the habit of substituting for the hot-air bath a prolonged packing in a wet sheet, surrounded by blankets. Patients often remain packed for periods varying from one to three or four hours, not only without distress but with comfort and decided relief.

Diuretics are notoriously uncertain in their action. I have often obtained good results from the imperial drink, in doses of from one to three pints in the twenty-four hours. A very efficient diuretic is a strong infusion of fresh broom-tops, taken in sufficient quantity to act as a purgative. The free action of a hydragogue purgative, elaterium, compound jalap-powder, or compound gamboge-pill, is very commonly followed by a copious flow of urine. The escape of water by the bowels

lessens the distension of the systemic veins, the circulation becomes more free, and therefore the secretion of urine more copious.

When other means fail to remove anasarca, acupuncture of the legs, or an incision with a lancet, often affords prompt and decided, and sometimes permanent, relief. I have seen a considerable number of cases in which life has been prolonged, and some in which complete recovery resulted, from the operation, after other means had failed to afford relief. It is very interesting to note the phenomena which follow upon acupuncture or incision of the legs in cases of anasarca. There is, first, a copious drain of liquid through the skin; then there is a further exudation of liquid from the over-distended blood-vessels; this liquid also escapes through the punctures, and its escape is often associated with temporary symptoms of exhaustion, a rapid and feeble pulse, and pallor of the face. Lastly, there often occurs a more copious secretion of urine, in consequence of the greater freedom of the circulation through the kidneys.

Dropsical accumulation tends to cause a secondary impediment to the circulation by the pressure of the effused liquid from without upon the blood-vessels, especially the veins. Again, the capillary circulation becomes more and more impeded in proportion to the increasing watery distension of the veins. The drain of liquid from the areolar tissue through the punctured skin, allowing a further exudation from the distended capillaries, thus removes or lessens the obstruction which results from over-fulness of the veins. The general circulation, therefore, becomes more free, and the greater freedom of the circulation through the kidney is attended, as we have seen, by a more copious secretion of urine. But it may be objected that incisions and punctures in anasarca legs are apt to excite destructive inflammation. It is true that inflammation and sloughing may follow the operation; but this may also occur from over-distension of the skin or the pressure of the heavy dropsical legs upon the bed. The result of my experience is, that inflammation of anasarca legs has been as often subdued as provoked by acupuncture or incision; that inflammation is less likely to follow punctures in cases of renal than cardiac dropsy; and that the risk of inflammation after an incision about a third of an inch long in each leg, or after several acupuncture, is so nearly equal that I would in any case give the patient or the surgeon the choice of the operation. If I were the patient, I should choose the incision as being on the whole less painful and more rapidly and surely efficacious.

Dyspnoea is one of the most frequent and distressing symptoms associated with Bright's disease. It has various causes, and requires various remedies. When it results from oedema of

the lungs, or dropsical hydrothorax, it is best treated by the remedies for dropsy. In some cases, anæmia appears to be the chief cause of dyspnœa. The red blood-corpuscles are the oxygen-carriers. When the blood—whether in cases of chlorosis or of Bright's disease—contains an excess of water with a corresponding deficiency of red corpuscles, the defective oxidation of the tissues—the demand for air—expresses itself in hurried and laborious breathing. The remedy for this form of dyspnœa is to be sought for in the elimination of water, a carefully regulated nutritious diet, and iron as a restorative tonic.

Paroxysmal dyspnœa in some cases appears to be of cardiac origin. The heart's action is rapid and feeble, or slow and feeble, the breathing distressed and hurried, with loud puerile respiration over the lungs. The dyspnœa in these cases seems to be due to the influence of deteriorated blood upon the pulmonary and cardiac nerves. It is not improbable that the cardiac weakness in some cases results from excessive contraction of the minute branches of the coronary arteries, and consequent anæmia of the muscular walls of the heart.

These distressing symptoms are often relieved for a time by ether or by brandy; and lately I have found that an occasional small dose (ten grains) of hydrate of chloral has done good. The cardiac and pulmonary symptoms to which I have referred are almost certainly made worse by opium in any form. There seems good reason to believe that in the hydrate of chloral we have a remedy, by the cautious use of which we may for a time mitigate some of the nervous symptoms which occur in the advanced stages of incurable Bright's disease. I refer particularly to the cramps and muscular twitchings, which are frequent precursors of convulsions, and the distressing restlessness which, associated as it is in a greater or less degree with uræmia, is generally aggravated by opiates.

The sufferers from Bright's disease are always dyspeptics, and the gastric symptoms are often very obstinate and distressing. When in consequence of renal degeneration the blood is contaminated by retained urinary excreta, there is often a vicarious excretion of these impurities by the mucous membrane of the stomach and bowels. The gastric secretions are mingled with the ammoniacal products of decomposing urea; digestion is consequently impaired; there is flatulent distension of the stomach and bowels, nausea, vomiting, and diarrhœa. Relief is to be sought by a carefully regulated diet, and by giving with the food from ten to twenty drops of dilute hydrochloric acid with a vegetable bitter. A small dose of strychnia, or the tincture of *nux vomica*, with a mineral acid, is sometimes

especially efficacious. Pepsine may sometimes be given with advantage.

In some cases of advanced renal degeneration, the vomiting is so incessant that the patient has to be sustained by nutritive enemata, while iced water only is taken by the stomach. In some instances that have come under my observation, the straining and exhausting efforts of vomiting have been checked only by frequent whiffs of chloroform-vapour.—*British Medical Journal*, Aug. 6, 1870, p. 135.

43.—ON A NEW TEST FOR ALBUMEN.

By Dr. CHARLES MEYMOTT TIDY, Joint Lecturer on Chemistry at the London Hospital.

The importance of detecting the presence of a minute trace of albumen in the urine must be my apology for proposing another test, which I am disposed to regard as more delicate than any I have ever tried. It may be that I have practised it more and know its peculiarities better than other tests. I do not propose it as likely to take the place of nitric acid, because it can be so easily obtained, and for all practical purposes shows a sufficiently marked reaction, especially when used in the manner proposed by Dr. Andrew Clark, of floating the urine on the acid, and noting the white layer of coagulated albumen where the two liquids join, I merely venture to propose my test as an exceedingly delicate confirmatory one, and likely, I hope, to be of some service where other tests leave a doubt as to the presence or absence of albumen. I may just say that it first occurred to me in the course of a long series of experiments I am now engaged upon respecting the action of various reagents upon the proximate principles of living matter.

The first method I adopted was a mixture of glacial acetic and carbolic acids. I still think this gives satisfactory results, but its preparation requires care. If there is too little acetic acid, the carbolic acid is not thoroughly dissolved when added to the urine, and this renders the liquid slightly opalescent, which appearance might be mistaken for a trace of albumen. If too much acetic acid is added, then the excess will redissolve the albumen. The plan I adopt is as follows: I mix equal volumes of the two acids, and then see whether, on adding this to a little water in a test tube, the liquid, after being well shaken, becomes perfectly clear. As a rule, I find this proportion is about correct; but if it does not become clear, I then add a little more acetic acid, trying it after each addition, until the desired point is reached.

The second plan I have to propose, and which has its advantages, is as follows:—Add to the liquid to be examined in a test-tube ten minims of alcohol (I employ it with a specific gravity of 0·805), shake thoroughly, but *gently*, so as to avoid the production of froth. Then drop in the same quantity of carbolic acid, and shake very thoroughly. Allow it to stand for a minute; and if the merest trace of albumen is present, distinct flocculi will be seen floating in the liquid. The alcohol and carbolic acid may be kept mixed, although I think it is more delicate when the experiment is made by dropping them in separately.

Respecting its delicacy, I may say that I can obtain distinct reactions with quantities of albumen that are undiscoverable by nitric acid, or heat and nitric acid. Distinct flocculi may be noticed with a solution of 1 part of albumen in 15,000 of water; whereas 1 in 8000 is the smallest quantity discoverable by nitric acid.

I may suggest, that if we are testing urine that contains such a small quantity as I have named, it will be necessary, in all probability, to filter it before applying the test; but of course this is not required, as a rule.

I will just add, that I have not as yet found anything in urine that will give this reaction with the test I have proposed, except albumen.—*Lancet*, May 14, 1870, p. 691.

SURGERY.

AMPUTATIONS, FRACTURES, AND DISEASES OF THE
BONES, JOINTS, ETC.

44.—AMPUTATION THROUGH THE KNEE-JOINT.

By C. F. MAUNDER, Esq., Surgeon to the London Hospital.

Amputation through the knee-joint having being lately revived as a substitute for removal of the leg either below or above that articulation, I determined to test its value should a suitable case present itself. The advocates of the method are of opinion that it produces less shock than either removal of the limb at the lower third of the thigh or at the upper third of the leg; that there is less risk of pyæmia, of exfoliation, and of osteo-myelitis, because the bone not being severed, neither its cancellous tissue nor medullary cavity are injured or opened. On the other hand, opponents to this operation would probably say acute inflammation of a large and extensive synovial membrane, with its serious effects upon the system generally, will arise and be followed by a prolonged and exhaustive suppuration. Also the cartilage will probably exfoliate, and this process will delay both the healing of the wound and a restoration to health. Under these latter circumstances there will be great danger of retraction of flap or flaps, consequent exposure of the condyles of the femur, and probably a second amputation will be necessary in order to remove these latter. Thus the time of the patient would be wasted, his sufferings would be prolonged, and the risk to life doubled.

The case selected was that of a female, about fifty years of age, the subject of an extensive sloughing ulcer occupying the lower two-thirds of the leg, and in an extreme state of exhaustion, both resulting apparently from want of food. While in hospital cleanliness and a nutritious diet had little or no effect on the character of the ulcer, and at the earnest entreaty of the patient, I at length consented to operate. I feared lest the shock of amputation would kill her. An anterior flap was made from the front of the leg long enough to wrap round the condyles, and a short convex posterior flap was also cut and

dissected off the deep fascia. The anterior flap was dissected up to near the level of the line of the articulation, and then the leg was severed from the femur by passing the knife through the articulation from before backwards. At the moment that the hamstring tendons were cut the structures at the back of the femur became enormously retracted—to the extent of from three to four inches—in a longitudinal direction. Knowing full well the tendency to retraction in this region I thought to allow for it by cutting, as already noted, a short posterior skin flap. Then, again, the patient's knee had been contracted for many weeks, the leg being almost bent at a right angle to the thigh; and consequently I judged (falsely as it appeared) that the skin would have already contracted almost as much as it could do by reason of this flexed position of the leg. At first sight it appeared to be necessary to remove both condyles and patella, in order that the anterior flap might be carried back to meet the posterior. However, on examination, it was found that, although the retraction in the middle line of the limb could not be remedied, still the skin on either side was lax enough to allow of the flaps coming together in such a manner that a T shaped, instead of a linear, wound resulted. The popliteal vein seemed inclined to bleed, and was ligatured. The arteries were twisted.

Progress of the Case.—A short time after the operation the patient showed little or no sign of shock, and on the following day no one would have guessed that she had been submitted to amputation twenty-four hours before. She progressed uninterruptedly well, and in due time left the hospital able to bear the firm pressure of my hand upon the end of the stump, and with the wound T shaped, not quite healed, situated at the back of the condyles. The patella was only slightly retracted, and was freely movable. A few days after the operation there was some little puffiness round the patella, and the synovial pouch probably became only slightly inflamed, and certainly did not suppurate. An accident which I had foreseen, and endeavoured to guard against, happened. In the first place the stump was wrapped in cotton wool, and loosely rolled with flannel, that no pressure of any kind might act upon it, and then the attendants were warned that if the limb rested on the back of the condyles the margin of anterior flap would slough. Notwithstanding all the precaution taken by me, a portion of the edge of the anterior flap did slough to the extent of some half an inch or more in depth, and thus cicatrization was delayed. That it was due to direct pressure I have no doubt, because the flap sloughed only on either side of its middle line, leaving a tongue-shaped portion at this point which had corresponded to the fossa between the condyles and where it had escaped pressure.

In all capital operations—amputations, for example—the surgeon's first thought must be for the life of his patient, his second to preserve as useful a limb as possible, I will assume that amputation through the knee fulfils the first consideration, as I believe it will be found to do, and as was the case most certainly in the above example. How is disarticulation to be effected? Often there will be no choice, the condition of the soft parts about the joint dictating the method. The circular makes a hollow cup in which secretions will lodge and putrefy; the method by long posterior flap involves the section of a great mass of muscle, the presence of large nerves which may suffer from pressure, a large suppurating surface, and a tendency of the flap to fall away and expose the condyles; it is undesirable. Lateral flaps might be taken, but none is so convenient as the method by a long anterior and a short posterior. The great desideratum in all amputations is that the patient shall be able to bear his weight upon the end of the stump; and to favour this the extremity of the bone must correspond with sound skin, not with cicatricial tissue. The latter method satisfies this demand. The end of the bone is covered by skin accustomed to pressure, the anterior flap falls naturally into position and secretions can readily escape. Thus then sound principles of surgery are followed; but there is one other requisite to insure success, and that is, care and attention to the position of the stump during the progress of repair. A surgeon cannot be always with his patient, and notwithstanding repeated advice and warning given to the attendants an accident may happen as in my case—sloughing of the free end of the long flap from pressure. This possibility leads to the consideration of the question; shall a single long flap be cut at the risk of sloughing from carelessness, or shall the chance of sloughing be met by preserving a short posterior flap also? I incline to the latter method, since by it also, where so long an anterior flap is not requisite more amputations may possibly be performed. In this operation large processes of bone are to be preserved, and to prevent their subsequent exposure at the sides of the bases of the flaps, the actual line of the bases of these flaps should be a finger's breadth below the level of the articulation. Also, the anterior flap should be wide, being begun and terminated on either side towards the popliteal space.

The operation consists in the formation of a long wide anterior flap, having a base as above mentioned, and an extremity not less than two and a half inches below the tubercle of the tibia when the limb is extended. This having been dissected up, without scoring of its deep surface, to near the joint level, a narrow-bladed knife should traverse the articulation from before backwards, either after the posterior flap has been cut

and dissected up or prior to its formation from within outwards. The posterior flap should extend as low as a point corresponding to the level of the lower end of the tubercle of the tibia.

N.B.—If from any cause the flap or flaps should prove too short, the removal by the saw of that portion of each condyle which projects backwards beyond the level of the posterior surface of the femur just above, will be equivalent to adding one inch in length to flaps.

While disarticulating, care should be taken not to injure the articular cartilage; the patella should scarcely be seen, and the synovial sac should not be unnecessarily disturbed. The interarticular fibro-cartilages should be taken away with the tibia. When cutting the posterior flap from within outwards the position of the head of the fibula must be remembered, lest it prove an obstacle to the free use of the knife. The leg is to be flexed during disarticulation as in excision of the knee; and also an assistant with both hands must retract the integuments from about the condyles.

To repeat: The chief points to be remembered in reference to this operation are:—(a) The soft parts in the popliteal space are liable to become extremely retracted; (b) the extremity of the long flap will slough if exposed to direct pressure.

Probably the reason why the integument of the popliteal space is so very elastic is that it may not be thrown into folds, and exposed to painful compression during flexion of the leg upon the thigh.

P.S.—To-day, June 28, and about six months since the operation, the patient came to the hospital. A more elegant or useful stump cannot be imagined.—*Medical Times and Gazette*, July 2, 1870, p. 4.

45.—ON AMPUTATION BY A CURTAIN FLAP OF INTEGUMENT, WITH SPECIAL REFERENCE TO THE THIGH, WITH CASES.

By JOHN D. HILL, Esq., Surgeon to the Royal Free Hospital, and Assistant-Surgeon to the Royal Orthopædic Hospital.

Integument forms the chief covering of those parts of the lower extremities which are destined to bear weight or pressure, as the os calcis, patella, and tuber ischii exemplify in the respective postures of standing, kneeling, and sitting.

When, therefore, accident or disease requires some new point to support the whole or a part of the weight of the body, the same structure would seem best adapted as a covering to the bone. I refer to amputation at the lower extremity, and especially the thigh.

Now, my own results hitherto tend to show that an integument flap has decided advantages over a muscular flap, circular or an oblique amputation—firstly, with respect to the construction of the stump and its influence upon the process of repair; secondly, as to the ultimate use of the extremity. Perhaps the following method may be regarded as the type of this operation:—

One half the circumference of the limb having been spanned, an anterior U shaped or rounded flap of integument is cut, from four and a half to six inches in length. This is dissected off the deep fascia to the point where the bone is to be sawn. A slightly curved incision is then carried across the back of the limb, also separating integument from fascia. The flaps now being drawn back, a circular sweep severs all structures to the bone, which is then sawn across. Hemorrhage having been arrested by torsion, or ligature, the flaps are brought together, and when complete, the line of suture will be at the posterior and inferior margin of the stump.

Now, this method combines the advantages of the circular and Teale's rectangular operations; and although there may be nothing new to relate, I would just venture to recite the following points in its favour:—

1. We have a flap which by its own weight falls over the face of the stump, like a curtain, requiring little or no pressure or support to keep it in position.

2. The muscles being cut short, spasmodic or continued traction of their fibres produces no disturbance of the flaps, nor separation of the edges of the wound, and ultimately there is little danger of what is termed a conical stump.

3. The large vessels and nerves, muscles and fascia, being cut transversely and in a line with the bone section, their relative position is but slightly disturbed, thus, the danger of pyæmia, phlebitis, deep-seated suppuration, and other complications, is lessened, and every facility is afforded for primary union.

4. The line of suture being at the posterior inferior margin of the stump, the wound is placed in the most favourable situation for healing, whether by first or second intention. Moreover, manipulation of the flaps being unnecessary in the after dressing of the stump, the latter is accomplished with the least amount of discomfort to the patient.

5. The cicatrix contracting, draws the sound integument further over the end of the bone, and, receding from the point where pressure will be exerted in the subsequent use of an artificial limb, it is ultimately found about two inches above the original line of incision.

6. The integument is moveable over the extremity of the bone, a point of importance as to the adjustment of pressure in an artificial limb.

7. Firm pressure can be borne upon the end of the stump when the wound is cicatrised, and ultimately the whole weight of the body, if required.

Thus we have a well-fashioned stump, rendering every facility for healing, and admirably adapted for ultimate pressure. Now, it may be suggested that the length of the anterior flap will in many cases of injury render the operation impracticable. This difficulty may be met by modifying the length, situation, and axis of the flaps according to circumstances. Again, it may be doubted whether the length and pendant position of the anterior flap will not threaten its vitality—indeed, slight congestion of the extremity has sometimes occasioned me such apprehensions. This, however, has always disappeared on elevating the stump and applying slight support to the flap, and in no case can I ascribe sloughing to its length or position.

Another objection may be urged as to muscular retraction after section tending to produce a conical stump. Should this immediately follow the knife, perhaps it would be advisable to saw the bone rather higher up, and obviate farther retraction by keeping the limb well bandaged from above downwards.

In five cases where I performed primary amputation through the femur and humerus respectively, such retraction occurred only in one instance—a fortnight after operation; but this was remedied by so bandaging the limb.—*Medical Press and Circular*, April 20, 1870, p. 308.

46.—ON REFRACTURE OF BONES.

By FREDERICK C. SKEY, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

I know of few better examples of sound effective surgery than results from the successful treatment of a case of a distorted and contracted limb, by reason of the mal-union of a broken bone, by its refracture. In the case of a broken femur, for example, it not infrequently occurs that, whether owing to imperfect extension, to a restless disposition on the part of the patient, or a discontented character of mind, which impels him to regulate the pressure of the splints in accordance with his own sensations, and especially in cases of a very oblique fracture, the bones may permanently overlap, and an angle is frequently formed at the point of union. In proportion to the shortening of the limb is the gait impaired, and the muscles are reduced in contractile power. In such cases the bone may be refractured with perfect

safety. Do not suppose that the capability to employ the limb in walking is any evidence of your inability to break it. In a case of simple oblique fracture of the femur, or of the bones of the leg, the patient may be capable of walking—that is, of throwing the entire weight of his body on the affected limb in the course of seven or eight weeks; but the weight being vertical the uniting tissues are firm enough to sustain the superincumbent weight; but if force be applied in a lateral direction, the union will readily separate for many weeks afterwards. I have broken the femur at the expiration of eleven weeks, and the bones of the forearm at that of seventeen.

Two important questions arise in connection with this subject:—

1. Will the bone thus broken again reunite? Why should it not? If nature has firmly united the broken bone in the first instance, why should she not in the second? The power of uniting a broken bone is inherent in every sound constitution. The very fact of primary union infers the presence of ossific power.

The second objection which has been raised is the uncertainty of separating the bones at the point of fracture. This is a frivolous objection. If a man of good muscular power fails with his greatest effort to break even a radius in the dried state, how can the shaft of the femur be broken by the muscular power of the human arm.

Granted (1) the impracticability of fracturing a living bone of the smallest calibre for which the operation of refracture can be required; (2) the all but certainty of reunion; (3) the simple and innocuous nature of the operation as regards the soft structures; and (4), the perfect safety of the shaft of the bone. What objection can be urged against an operation which contemplates the removal of a serious evil to the frame without suffering or inconvenience? The only limit to time is the power to break. I made a vigorous attempt to break the femur at ten months. In this I failed, but the man walked back to his ward without pain or difficulty. Chloroform having been administered, the limb is brought to the edge of the table, which is covered with half a dozen folds of a blanket. The weight of the body of the operator is brought slowly and gradually to bear on the point of fracture; and any additional force in moderation may be resorted to. The separation will be audible to bystanders, and when the rotation of the lower fragment proves the entire separation of the fractured ends, the movements should be freely made with a view to detach all the fibrous adhesions yet connecting them. The sensation to the surgeon manipulating is not that allied to crepitus. The impression conveyed to the hand has nothing of the crispness caused by a

recent fracture, but rather like the laceration of soft or fibro-cartilaginous substance yielding under continuous pressure. Pulleys very deliberately applied are requisite to overcome the long-continued contraction of the muscles. The artery has been abnormally shortened, and will rejoice in its restoration.—*Lancet*, Sept. 17, 1870, p. 395.

47.—CASE OF TRANSVERSE FRACTURE OF PATELLA, WITH OSSEOUS UNION, TREATED WITH GUTTA-PERCHA SPLINTS.

By JOHN WOODMAN, Esq., Honorary Surgeon to Exeter Dispensary.

On the evening of August 21, 1869, W. E., aged 32, a smith and fireman, and a muscular man, was running quickly in the street on an alarm of fire, when he tripped, and, to save himself from falling, threw himself backwards, and in doing so felt something snap in his knee, and fell down. He was brought to my house, and attended to in my temporary absence by my neighbour, Mr. S. Perkins.

On the following morning I saw him, and found on examination that the left patella was transversely fractured and that the two portions were entirely separated, being drawn widely apart on the slightest attempt to bend the knee. I brought the two portions together with strips of sticking-plaster and a figure of eight bandage, and placed the leg on an inclined plane, with the heel a foot higher than the hip, but finding it impossible to keep them in perfect apposition in this way, on the 23rd I moulded a gutta-percha splint to the front of the knee, cut a hole in it exactly the size of the patella, and then applied this, padded with a little cotton-wool, and another gutta-percha splint for the back of the leg, keeping them moderately tight with a bandage, so as to press the patella through the hole in the splint, and thus hold the two portions firmly together. This answered the purpose admirably, and gave him no inconvenience at all. He was kept like this, with his leg on the incline, for about six weeks, and when he moved about he wore a light wooden splint with the front gutta-percha one, with a portion cut off to make it lighter. He was very anxious not to strain the knee, and kept the back splint on for nearly five months, whilst working at his trade.

I saw him on July 16, 1870, just eleven months after the accident, and found the bone perfectly united with osseous union, so much so as to render it almost impossible to detect the seat of the fracture; the edges of the bone are quite natural and smooth, and only a slight irregularity in the middle of the

surface of the front of the patella can be detected on a minute examination. He can use the leg very well; although he cannot bend it quite as much as the other, still it is fast improving. His own remark was, "It is stronger than the other knee, and I have tried it very much in my trade" (a blacksmith).

The success in this case I attribute entirely to my being able to keep the two portions of the bone in such perfect apposition. As the plan is so simple I dare say it may have been tried before, still, as I cannot find it mentioned in any of the text books on surgery, there may be some of my professional brethren to whom the case may be of interest, especially as I see Eriehsen says that only two or three cases of osseous union are on record. —*Medical Times and Gazette*, Aug. 20, 1870, p. 204.

48.—FLANNEL AND PLASTER OF PARIS SPLINT.

By CHRISTOPHER HEATH, Esq., Surgeon to University College Hospital.

Mr. Heath describes a splint recently introduced from Germany. It is easily made, and forms an efficient substitute for the expensive and troublesome leather splint. It is made as follows:—a piece of flannel folded into a double layer is laid underneath the leg; by gathering it up on either side, so as to make its edges meet over the crest of the tibia, and the dorsum of the foot, and cutting off what is superfluous, it is adapted to the shape of the parts. The same is accomplished for the foot-piece by cutting out the fold which results from bringing together over the middle line of the sole the opposite sides of the end of the flannel. Then, as a guide to the next step, a line is drawn in continuation of the middle line of the sole, along the under surface of the leg, and through the part corresponding to the centre of the popliteal space. Next, the flannel being removed, the two layers are united by two lines of stitching, about a quarter of an inch apart, and one on either side of the guiding line. The flannel is then accurately replaced, and the layer adjacent to the skin pinned in position, while the outer one is allowed to drop and hang from the double row of stitches on the under surface. The outer surface of the inner layer having been spread with plaster of Paris to a depth of about two lines, the other layer is brought up on either side of the leg and foot, and accurately adjusted to the first, to which it soon becomes adherent, while the entire structure sets into a firm and solid splint. It admits of no eversion at the edges, and the coherence conferred by the texture of the flannel counteracts the brittleness and the tendency to crack spontaneously, which are liable to give trouble with plaster of

Paris as usually applied. The splint can be maintained in position by bandages and strapping. The thin line of flannel, which has been kept free from plaster by the double row of stitches, and preserves its pliancy, forms a hinge, which enables the splint to be removed and readjusted as often as occasion may require.—*Lancet*, Oct. 1, 1870, p. 469.

49.—NEW MATERIAL FOR SPLINTS.

Mr. HUTCHINSON has recently been trying hatters' felt for splints. It can be obtained at any hatter's, is cut to the required shape, dipped in hot water, which softens it, and it is then moulded to the limb. As it dries it stiffens, and forms an excellent support. There are several cases in the hospital now in which it has answered capitally in children. It has not been tried yet, we believe for adults.—*Medical Times and Gazette*, Aug. 13, 1870, p. 174.

50.—FURTHER EVIDENCE REGARDING THE EFFECTS OF THE ANTISEPTIC SYSTEM OF TREATMENT UPON THE SALUBRITY OF A SURGICAL HOSPITAL.

By JOSEPH LISTER, Esq., F.R.S., Professor of Clinical Surgery
in the University of Edinburgh.

[Dr. Saxtorph, of Copenhagen, having written to Professor Lister an interesting letter showing the great success of the antiseptic plan of treatment in the Frederik's Hospital of that city, Professor Lister naturally asks how it is that similar results have not been obtained in England.]

It may seem strange that results like these should have been obtained in Copenhagen, when so little approach to them has yet been made in the capital of England. The fact, however, is not difficult to explain. Want of success in many quarters has not arisen from any unwillingness to try a new mode of practice. On the contrary, the publication of my first papers was followed by a very general employment of the material which I happened to select for carrying out the treatment, and which, unfortunately for the principle involved, was then little known in British surgery, so that the striking results which were recorded were too often attributed to some specific virtue in the agent. The antiseptic system does not owe its efficacy to any such cause, nor can it be taught by any rule of thumb. One rule, indeed, there is of universal application—namely, this: *whatever be the antiseptic means employed (and they may be very various), use them so as to render impossible the existence of a living septic organism in the part concerned.* But the carrying out of

this rule implies a conviction of the truth of the germ theory of putrefaction, which, unfortunately, is in this country the subject of doubts such as I confess surprise me, considering the character of the evidence which has been adduced in support of it. Yet, without this guiding principle, many parts of the treatment would be unmeaning; and the surgeon, even if he should attempt the servile imitation of a practice which he did not understand, would be constantly liable to deviate from the proper course in some apparently trivial, but essential detail, and then, ignorant of his own mistake, would attribute the bad result to imperfection of the method. For my own part, I find that, in order to approach more and more to uniform success, it is necessary to act ever more strictly in accordance with the dictates of the germ theory. Failure on the part of those who doubt or disbelieve it is therefore only what I should expect.

Another great cause of failure undoubtedly is, the careful attention necessary in order to exclude, from first to last, the subtle putrefactive organisms that people the atmosphere and form part of the dust which adheres to all exposed objects. The germ theory, while it furnishes the clue to success, affords ample explanation of failure. I believe I do my professional brethren in Britain no more than justice when I say that if they felt anything like the assurance expressed in Professor Saxtorph's words, "the reward is certain," they would not grudge a greater degree of trouble than the antiseptic treatment demands. And, in truth, when once a surgeon has become thoroughly initiated into the practice, it is in most cases a saving of trouble. Thus I have at present a patient about to leave the infirmary three weeks after the removal of the entire mamma for scirrhus, all the axillary glands having been at the same time cleared out after division of both the pectoral muscles, so as to permit the shoulder to be thrown back and the axilla freely exposed, as is done in the dissecting room—a practice which I have for some years adopted where the lymphatic glands are affected in that disease. In this case a great deal of care was certainly required for the first few days; but after a week the dressings were only changed once in three days, and when a fortnight had elapsed, cicatrization being almost perfect, a week was allowed to pass without any interference. Hence, on the whole, the labour was considerably less than with ordinary treatment, and a very much greater amount of pains would have been amply repaid by the beautiful linear cicatrix, formed without the occurrence of one drop of pus, and without any serious constitutional disturbance. This, however, was an instance in which an unusual degree of care was requisite; for the axilla is one of the most difficult situations in the body to guard antiseptically, and I have only my-

self learnt quite recently the art of doing this, as I believe, with security. But in most cases the details of the treatment are not troublesome to execute by anyone accustomed to them; yet they nevertheless require at first earnest practical study until their employment has become habitual and instinctive. It is therefore not to be wondered at that surgeons endeavouring to carry out the treatment without having seen it in operation, and only half persuaded of the importance of the object to be attained, should fail time after time, and throw up the attempt in disgust. Professor Saxtorph, on the other hand, having observed the effects of the antiseptic treatment, and appreciated its importance, spent a considerable time in carefully watching it in operation, and then set to work in right good earnest to carry it out; and, as he believes in the germ theory of putrefaction, it is not surprising that sound principle and careful practice should have been crowned with the success which he has related.

I had not intended to have published anything regarding the general condition of my wards in Edinburgh till a longer period should have elapsed. But in connexion with Professor Saxtorph's letter I may state that, having now been in charge of fifty beds for nine months in the Royal Infirmary here, I have as yet had no instance of pyæmia, although many cases have been admitted in which it might, under ordinary treatment, have been apprehended, such as compound fractures, amputations in the lower limb, and extensive gouging operations upon bone. Hospital gangrene also has been entirely absent. Though several cases of ulcers of long standing have been under treatment, there has never been any appearance of greyness of the surface to indicate even the mildest form of the disease.

Two cases of superficial erysipelas occurred in December; but these seemed to me attributable to cold rather than to any poisonous condition of the atmosphere. In my former paper on this subject I mentioned a case in which erysipelas appeared in a stump after amputation of a leg, long after the patient had left the Glasgow Infirmary with the wound entirely cicatrised; and I remarked upon the interest of that case as occupying an intermediate position between traumatic and idiopathic erysipelas, implying that local irritation of such trivial nature as that of a contracting cicatrix might determine the occurrence of the complaint in a person predisposed to it constitutionally. We know also that exposure to cold is the most common exciting cause of the idiopathic form of the disease, which is entirely independent of any unhealthy state of the air. It therefore seems not unreasonable to suppose that where the local irritation of a wound coexists with a chill, traumatic erysipelatous inflammation may become developed in some persons in a per-

fectly pure atmosphere; and such seemed the most probable explanation of the two cases to which I am now referring. One of them was a man above the middle period of life, in whom I had performed amputation at the knee-joint. Five days after the operation, the discharge amounting to only a few minims of serum in the twenty-four hours, and the patient being free from constitutional symptoms, I thought him a favourable subject for illustrating the antiseptic dressing of a stump before the clinical class. Accordingly I had him taken into the theatre, and dressed him there; and, not thinking how time was passing, I left the stump covered only with a piece of calico soaked with cold watery solution of carbolic acid while I discussed at considerable length the mode of procedure. It happened to be one of the coldest days of that severe winter, and it afterwards occurred to me that I had been guilty of imprudence in exposing the stump so long. Next day he complained of not feeling so well, and the skin near the wound exhibited the commencement of an erysipelatous blush, which spread some distance up the trunk before it finally subsided. The other case was one of removal of the mamma for scirrhus. In changing the dressings the exposed surface of the chest was syringed with the cold watery solution of carbolic acid, and, in that very cold weather, a chill was certainly not unlikely to occur from such treatment. Here also a blush of redness appeared near the wound, and, though it was only superficial and did not spread far, it was unmistakably erysipelatous. Taking this view of the cause of the complaint in these two cases, I adopted the simple expedient of making the 1 to 40 watery solution of carbolic acid by mixing that of the strength 1 to 20 with an equal quantity of hot water, so as to make a warm lotion; and during the seven months in which this plan has been pursued we have had no more appearance of erysipelas.

Thus my wards, although by no means models, as regards their principle of construction or the space allowed between the beds, appear perfectly free from any liability to hospital diseases.—*Lancet*, Aug. 27, 1870, p. 287.

51.—A METHOD OF ANTISEPTIC TREATMENT, APPLICABLE TO WOUNDED SOLDIERS IN THE PRESENT WAR.

By JOSEPH LISTER, Esq., F.R.S., Regius Professor of Surgery, University of Edinburgh, and Surgeon to the Royal Infirmary.

Having been request to furnish some rules for the antiseptic treatment of wounded soldiers in the present war, I venture to suggest the following plan, in the hope that it will combine

efficiency with the simplicity and facility of execution essential under such circumstances.

Wash the wound thoroughly, and also the surrounding skin, with a saturated solution of crystallised carbolic (phenic) acid in water, one part of the acid to twenty of water, introducing the fluid by means of a syringe, and manipulating the parts freely so as to cause the lotion to penetrate into all the interstices of the wound; and at the same time squeeze out such clots of blood as it may contain. The fluid should be introduced repeatedly to insure its thorough penetration. Tie any bleeding vessels with properly prepared antiseptic catgut, cutting off the ends of the thread near the knot. If the surgeon do not possess this article, the arteries should, if possible, be secured by torsion; but for the sake of cases in which a ligature would be absolutely indispensable, some silk or linen thread should be kept steeping in a strong oily solution of carbolic acid, or, if very fine silk be used, it may be rendered antiseptic by steeping for a few minutes in the watery solution. When silk or linen is employed, the ends of the ligatures should be left projecting at the wound. While the antiseptic lotion is in the wound, extract if possible, any foreign material that may have been introduced, such as a bullet or a portion of the patient's clothes; and if any spicula of bone exist entirely detached from the soft parts, remove such as can be readily reached, disregarding those which are of very small size or inconvenient of access. Then place upon the wound two or three layers of oiled silk smeared on both sides with a solution of carbolic acid in five parts of any of the fixed oils—olive, almond, linseed, &c.—the oiled silk being made large enough to cover the raw surface completely and slightly overlap the surrounding skin. Next apply, without loss of time, lint, charpie, or cloth (linen or cotton), well steeped in the oily solution of the acid, the cloth or lint being folded sufficiently to produce a layer at least a quarter of an inch in thickness, and extending a considerable distance, say three inches, beyond the oiled silk in all directions, the outer layer being made somewhat larger than the rest, so that the margin of the mass of cloth may be thin. Cover the oily cloth with a piece of thin gutta-percha tissue sufficiently large to over-lap it on all sides by an inch or more, and retain it securely in position by a roller steeped in the antiseptic oil. Round this again wrap a still larger piece of folded cloth, say a folded towel, also steeped in the oily solution of carbolic acid, and cover it with a piece of oiled silk or gutta-percha.

With a view to the intelligent application of this dressing, it will be well to state briefly its *rationale*. The watery solution is applied in order to destroy once for all any septic particles that may have been introduced into the wound; and the oily

solution is employed to prevent the spread of putrefactive fermentation into the wound from without. The oiled silk, which is but slightly permeable to carbolic acid, protects the raw surface from the irritation of the acid in the oily cloth, and permits it to heal as under a scab. But though the ultimate office of the oiled silk is to protect the wound from the irritation of the antiseptic, it must itself be antiseptic at the time of application, and is therefore smeared with the oil, which in the course of no long time loses its carbolic acid by diffusion into the wound beneath. The substantial and widely extending oily cloth serves as a store of the antiseptic; but the bloody and serous discharge soaking into the porous cloth tends to wash away the oil and deprive the dressing of its antiseptic character; hence the necessity for the gutta-percha, which prevents the discharge from making its way directly outwards from the wound, and so establishing a road for the penetration of putrefaction inwards. At the same time the gutta-percha, though impermeable to watery or oily fluid, being readily permeated by carbolic acid, permits the antiseptic ingredient to pass in through it from the outer cloth and act upon the discharge that flows out beneath the overlapping margins of the gutta percha. The outer cloth is intended to be changed as occasion may require, in order to keep up the supply of the antiseptic, while the gutta-percha and all beneath it constitute a more permanent application. The layer of gutta-percha or oiled silk outside the external cloth is to prevent the oil in that cloth from being wasted by soaking out into the surrounding articles of clothing, &c.; or, still worse, neutralised chemically by the penetration inwards of putrid blood or other discharges from the ambulance waggon or bedding. The circumferential part of the deeper cloth will, in consequence of its thinness, be kept completely antiseptic by the carbolic acid which passes inwards through the gutta-percha, while the deeper layers of the thicker portion over the wound will probably in a few days be destitute of antiseptic, and therefore of stimulating, properties; hence the oiled silk, though desirable in order to insure the absence of "antiseptic suppuration," is by no means an essential part of the treatment, and if none of it be at hand the procedure may in other respects be conducted in the same way without it. Again, if the surgeon have no gutta-percha at his disposal, the risk that would otherwise arise from the permeability of the dressing may be overcome by frequently changing an external antiseptic cloth, or by treating its surface every few hours with the antiseptic oil.

The changing of the outer cloth will require care in order to avoid raising the edge of the gutta-percha along with it, and so admitting septic air towards the wound. It may be done

with perfect security by having the cloth consist of two parts, one covering each half of the gutta-percha, and, as one half is raised, throwing a stream of watery solution (1 to 40) with a syringe upon the margin of the gutta-percha, a fresh oiled cloth being at once applied before the other portion of the former cloth is removed. If sufficient time cannot be spared for changing the outer cloth in this careful manner, it will be better for the surgeon to content himself with pouring fresh oily solution upon the exterior of the cloth without disturbing it, taking care that the oil enter well beneath its margins. I would advise that this should be done in preference where a large number of wounded have to be treated by one surgeon.

The strong oily solution (1 to 5) would irritate the skin if used continuously: after the first dressing a solution of half the strength should be employed, and after a few days it may be reduced to 1 to 20 if excoriation should occur.

The times of changing the outer cloth, or treating it with fresh oil, should be in accordance with the amount of discharge. During the first twenty-four hours the effusion of blood and serum is necessarily profuse, and it will be well that fresh oil be applied to the outer cloth within twelve hours of the first dressing; or even in six hours if there should be unusual oozing. On the second day, also, in the case of a large wound, two dressings in the twenty-four hours will be desirable. After this, if all go well, the discharge will diminish quickly, and a daily renewal of the antiseptic supply will be sufficient; and when five or six days have passed, to apply the oil once in two days will be all that will be required. This, however, should be continued after discharge has ceased entirely, till sufficient time has passed to insure that the wound has healed by scabbing, or at least has been converted into a superficial sore.

The earlier the case comes under treatment the greater will be the prospect of success, but even after the lapse of thirty-six hours it need not be altogether despaired of.

In the case of compound fractures, the essential objects of the treatment may be attained by using splints constructed of stout iron wire bent into the form of the margin of a lateral splint, and strengthened by cross pieces here and there. Such splints can be readily extemporised by the surgeon himself, by help of two pairs of wire-forceps. The splints should be applied one at each side of the limb, without any padding opposite the seat of injury except the dressing above described, but padded elsewhere with any suitable soft material, an interval being left between such padding and the dressing. The outer layer of oiled-silk or gutta-percha should be applied outside the splints, so that all that will be requisite in order to apply oil to the outer cloth will be to take off the oiled silk with its retain-

ing bandage, and pour on the oil through the ample intervals between the wires. Or the splints might be applied immediately external to the bandage that retains the deeper layer of gutta-percha, leaving the outer cloth to be wrapped round external to the splints, cotton or charpie imbued with the antiseptic oil being tucked in under the splints to keep the margins of the gutta-percha in apposition with the limb, the cotton being changed as often as the cloth itself.

For the sake of the general healthiness of the atmosphere of the crowded military hospitals, it is extremely desirable that even superficial granulating sores should be treated antiseptically. This may be done consistently with rapid healing by washing the sore with watery solution of carbolic acid (one to twenty), and covering it with two or three layers of oiled silk smeared with the oily solution (one to twenty), with well overlapping folded cloth steeped in similar oil, and over all a piece of gutta-percha tissue and bandage.

I have suggested in the above method the employment of such materials as are likely to be accessible to the surgeons of both armies. Other means exist, in some respects very superior. But the supply of these is at present limited, and those who possess them probably understand their use.—*British Medical Journal*, Sept. 3, 1870, p. 243.

52.—OBSERVATIONS ON THE USE OF CARBOLIC ACID IN SURGERY.

By EDWARD R. BICKERSTETH, Esq., Surgeon to the Liverpool Royal Infirmary.

[The following cases are very demonstrative of the advantages to be derived by the adoption of the antiseptic treatment, by which suppuration is almost altogether prevented, and the risks arising from the exposure of deep tissues to atmospheric agencies very much lessened.]

Case. 1.—Suppurative synovitis of the knee-joint in an old man; the joint opened and washed out with carbolic lotion; recovery without subsequent suppuration, and with a movable joint.—James K., a feeble old man, who said he was only 60 years of age, but looked much older, was admitted into No. 6 ward, on March 24, 1869. He stated that pain and swelling had existed in the left knee for upwards of a month, but that he had continued to work as a labourer till a week before admission. The joint was much swollen, and the patella floating from synovial effusion; and there was so much general febrile disturbance of the system that I suspected suppuration was commencing.

The limb was placed in a M'Intyre splint. Linimentum iodi was freely applied over the lower half of the thigh and the

upper half of the leg, but not over the joint, which was ordered to be constantly fomented. Under this local treatment and appropriate general management there was decided alteration of the general symptoms, and the swelling of the leg decreased for a few days; but afterwards the swelling of the thigh was observed to have increased, and, from the extent and position of the fluctuation, it was obvious that the effusion within the joint had escaped beyond the synovial capsule and had penetrated among the deep muscles. On April 5th I introduced an ordinary hydrocele trocar on the outer side of the joint, and drew off about three ounces of thick synovial fluid, which was followed by upwards of an ounce of pure pus. Fomentations were persevered with, but the iodine liniment was discontinued. For a few days after this procedure there was some improvement in the general condition of the patient, and apparently of the limb; but very soon the swelling increased, and became larger than before, extending upwards as high as the upper third of the thigh. Fluctuation was very perceptible, and the skin became red and oedematous over the lower and lateral surfaces. No doubt could now exist that the joint was full of pus, which was making its way upwards among the deep muscles around the femur.

The prospect of affording relief by laying open the joint, in an old man of feeble constitution, exhausted by long confinement and suffering, was almost hopeless, and I should have despaired under the ordinary plan of operating. By strictly adhering to the rules and principles of the antiseptic treatment I believed that the contents of the cavity might be safely evacuated, and that then, the principal source of irritation being removed, resolution and repair would take place. On April 14th, under the protection of carbolic oil, which was constantly smeared over the part during the whole of the operation, I made an incision, four inches in length, on the outer side of the joint, and opened the articulation, giving vent to a large quantity of thick purulent matter. By making pressure around the thigh and the joint I then endeavoured to empty the cavity entirely, and while this was done the entrance of air was prevented by keeping folds of lint soaked in the oil over the incision. But I found it impossible to press out all the pus, and as I considered this a matter of great importance, and had moreover frequently observed the good effects of washing out the cavities of deep-seated abscesses with carbolic lotion, I determined to do this in the present case. Passing my finger into the joint along with the nozzle of the injecting syringe, I threw in upwards of a pint of the watery solution (1 in 40), thoroughly washing out the whole cavity of the joint and of the abscess. The fluid was then pressed out, the same care being taken as before to prevent the entrance of air. I felt the cartilaginous surface of the joint

softened and flocculent. The thigh was supported by a many-tailed bandage, so as to keep the walls of the abscess in contact, and the wound was protected by oiled lint. So much oozing, however, continued to come from the incision that I was reluctantly compelled to remove the covering, and plug the wound with lint soaked in carbolic oil, which I covered with a pad of oiled lint having oil-silk over it, and cotton wool and a bandage over that again. I directed the plugs to be removed after twelve hours, but, unfortunately, at the time of removal the bleeding recurred, and it was necessary to replace similar ones and dress the incision as before.

On the third day after the operation the plugs of lint were carefully removed under the protection of carbolic oil, and three thicknesses of lint soaked in the oil were then placed over the incision, overlapping it at least two inches every way, and secured in position by tapes. Over these were laid three other layers, with oil-silk over all; and each day these latter were renewed and the deeper ones resaturated with oil. Not a trace of suppuration was observed till the 23rd (nine days after the operation), when, on pressing the deep folds of lint, a drop or two of pus exuded. They were therefore renewed, but the wound was not looked at, because as the old protection was drawn off another was slipped on.

For the succeeding five weeks nothing was done beyond the daily removal of the upper layers of the lint. Once or twice it was thought that a drop or two of semi-purulent matter exuded when the under pieces of lint were pressed, but the quantity was so small as to be doubtful. The swelling of the thigh disappeared, and the knee resumed its natural size and shape, so that the bandages encircling these parts required to be frequently tightened. The general state of the man improved greatly.

On May 28th I ventured to remove all the dressings and inspect the wound. It had healed soundly except at the upper part, where a small fistulous opening existed, from which I pressed four or five drops of pus. The carbolic dressings were replaced immediately. Three days afterwards (May 31st) a few drops of pus were observed, and the wound was again exposed, when the small aperture before noticed was found to have enlarged considerably, and a substance looking like a piece of fat, of the size of a small walnut, fell out. This proved to be one of the plugs of lint, which had thus remained embedded for upwards of six weeks. The cavity from which it escaped was lined with healthy granulations, and had no connexion with the joint. It healed in a few days with simple dressings. On June 5th the limb was removed from the M'Intyre splint, and placed over an ordinary bed-pillow supported on either side with sand-bags.

Passive movements of the joint were then commenced, and after a few days the patient was able to raise the limb without assistance, and to bend the joint slightly. On July 10th he walked with the assistance of a stick, and soon afterwards was well enough to leave the hospital at his own request.

Case 2.—Chronic disease of knee-joint in a boy aged eleven; suppuration in joint; rupture of matter into tissues of thigh, and formation of chronic abscess; evacuation of abscess, and recovery without any subsequent suppuration.—The patient, a boy aged 11, had suffered for some time before coming under my care from strumous enlargement of the left-knee joint. The joint had at one time almost got well, but not very long before I saw him the boy had slightly injured it, the swelling had reappeared, and matter had formed in the joint and eventually burst into the tissues of the thigh. When brought to Liverpool the patient was attenuated and worn out to the last degree. The sound thigh was a mere spindle not much thicker than a man's wrist, while the diseased one presented the appearance of a great shaking bag of matter, extending from the upper third of the thigh down to the knee, and equal to about two-thirds the circumference of the lad's chest. It was plain that the pus was to be evacuated, but it was equally plain that if the abscess was opened in the usual manner, and poultices applied, the risk of exhaustive suppuration would be so great as to give the patient, in his enfeebled condition, very slight chance of recovery. It was determined to use the antiseptic method, which at that time consisted in the use of the carbolic putty (made of carbolic oil and whitening) and a covering of tin-foil. On Nov. 30th, 1868, therefore, chloroform was administered, and a free incision was made on each side of the joint, an antiseptic curtain of lint dipped in carbolic oil being instantly let fall over each wound. An immense quantity of pus flowed out beneath the curtains, and the abscess was then completely emptied by pressure. A layer of carbolic putty, spread on linen, and larger than the curtains, was then applied over each, and above these again pieces of soft tinfoil, and finally strips of interrupted bandage to keep all in place. The curtains were retained in position by tapes passing round the thigh. The leg was then placed upon a light iron splint reaching up to the buttock, and provided with a foot-piece, which was slung in a cradle.

The patient recovered well from the chloroform, and his progress from that day was uninterruptedly favourable. Each morning, and for the first few days each evening also, the carbolic putty was renewed, and the tinfoil and strips of bandage replaced; but the curtains were carefully left untouched, being merely resaturated with oil. The thigh was gently pressed from above downwards, in order to make sure that no matter was

accumulating in the upper part of the old abscess; and, after a few days, a bandage was put on at that part, so as to consolidate and keep the tissues supported. The boy's appetite returned at once after the operation; and the improvement in his general condition was most marked and rapid. He had anything to eat that was nourishing and digestible, drank some porter and a glass or two of sherry each day, and had a tonic mixture and cod-liver oil.

The daily history of the case need not be detailed. The curtains were not removed for a week; at the end of which time new ones were supplied, being slipped down over the old ones as the latter were drawn away, so that the wounds were never exposed. This treatment was diligently pursued (new curtains being supplied every week or ten days) for a period of five or six weeks; and not till then were the wounds looked at, a liberal dose of oil being allowed to flow over them during their momentary inspection. It was found that the edges of the incisions had gaped considerably; but they were filled up by smooth, pale, inactive granulations at each end for about two-thirds of their whole extent. In the centre of each was a yellow looking portion, over which the granulations did not extend; and some old cheesy flakes of pus, the remains of what escaped at the time of operation, were lying about these parts. *During all these weeks, from the hour of the operation, there never exuded more than one or two drops of pus daily from the incisions.* The former dressings were again renewed, as the child's parents were anxious that perfect success should be obtained at any cost of time and patience. At first, after the matter was evacuated, the joint was a round shapeless mass; but gradually, so to speak, it softened down, the patella became recognisable, and the hollows about the articulation reappeared. From time to time the wounds were glanced at; but they seemed to remain very inactive. At length, however, the yellow-looking portions diminished to mere lines in the centre of the deepest portion of each wound; and then lint, dipped in carbolic oil and covered with oil-silk, was applied daily, and, after a further interval, red lotion was employed to hasten cicatrisation. The original splint and swing had been dispensed with for nearly a couple of months in favour of a light steel back splint, carefully adapted to the thigh, in order to secure immobility of the joint. The patient called upon me a short time ago, nearly eighteen months after the operation. He was then in excellent health, and able to walk well, with no more lameness than resulted from the joint being almost ankylosed in a nearly straight position. He wears a light steel support, to prevent a slight tendency to backward displacement of the tibia which still exists.

With regard to the first case, I have recorded it fully because

I consider it well exemplifies the marvellous influence of the antiseptic treatment when minutely, thoroughly, and persistently carried out. I have constantly practised making free incisions into acutely inflamed and suppurating joints, and am well aware of the advantages to be derived from so doing; but that this can be accomplished without subsequent considerable and exhausting discharge, and with success in an old and enfeebled subject, is entirely beyond my experience under any other plan of treatment than that which was adopted.

The first case, then, was an acute suppuration in the knee-joint of an old patient. The second was of a perfectly different nature, being a chronic suppuration in a young subject, and consequently of a more hopeful nature as regarded the patient's ultimate recovery. But here, too, I assert that under no other mode of treatment could a great abscess connected with the largest articulation in the body have been safely opened, and have finally closed up, without more than a daily escape of, at the most, a drop or two of matter. Of course, after the abscess had consolidated, and nothing remained but two red granulating lines, the carbolic treatment having been discontinued and red lotion applied, then at once matter formed, as from a mere superficial sore. Indeed I should say that more true pus came from these superficial sores in a day, during the short period they took to cicatrise, than escaped from the wounds during the many weeks of carbolic treatment which succeeded the operation. At the time this case was treated, Professor Lister had not brought out the carbolic plaster, and the putty and oil were then in use; but it serves to show that, whatever the materials, and however employed, if the particular principles of the antiseptic method be rigidly adhered to, success may almost always be obtained.—*Lancet*, July 2, 1870, p. 6.

53.—THE ANTISEPTIC PRINCIPLE IN SURGERY.

By the Editor of the LANCET.

A letter of Dr. Saxtorph, Professor of Clinical Surgery in the University of Copenhagen, published in the *Lancet* on the 27th ult., as a part of Professor Lister's communication, again revives that most urgent of all surgical questions—the antiseptic use of carbolic acid. It is impossible that this question can rest where it is. The averments on the one side are so strong and remarkable, and the incredulity of leading English surgeons is so general, that some decisive steps should be taken to come to a scientific decision. If we had a Royal Society of Medicine, the question would be well worthy the consideration of a specially appointed committee. In the meantime we can only receive evidence. And the evidence of Professor Saxtorph is explicit,

and equals in physiological interest anything published by Professor Lister, unless, indeed, it be the incorporation with a ligatured vessel of the catgut ligature made antiseptic with carbolic acid. Professor Saxtorph reports the abolition of pyæmia from his wards in the last twelvemonth, and says the result is certainly owing to the introduction of the antiseptic treatment, which he had seen practised by Professor Lister at Glasgow. It may be objected that this result is accidental. This cannot be said of other results obtained by the Professor. He details a case in which he had to open the knee-joint by a large incision, and had then much difficulty in extracting from it what proved to be a part of the head of the tibia. The operation lasted a quarter of an hour. The fingers, forceps, and different hooks had to be used. *But the wound closed without any suppuration of the joint.* This is attributed to the treatment, and such an uncommon result is not easily explained apart from exceptional treatment, which is thus described by Professor Saxtorph:—"During the whole time I poured a stream of carbolic solution over the wound"; after the operation, "I treated antiseptically." He does not say how many compound fractures he has had, but some of them have been very severe. He has treated them all antiseptically. And they have all *healed without the least suppuration in the fracture itself*, and the consolidation did not take much longer time than in a simple fracture. *All the amputations have recovered.* There has never been profuse suppuration, and never any putrefaction. These are certainly splendid results. The abolition of pyæmia in wards in which there were cases every year, the rough handling of a knee-joint for a quarter of an hour without any suppuration, and the prevention of suppuration in compound fractures, are effects which must be explained, and which seem to have their explanation in the use of carbolic acid as recommended by Professor Lister. The abolition of pyæmia, the prevention of the process of suppuration in cases in which hitherto it has been considered inevitable, and the entire prevention of putrefaction, are all very congruous and consistent results of the same principle of treatment. Professor Saxtorph endorses all that Professor Lister has said about the necessity of minute care. "Unless you take the greatest precautions in *every* dressing till the wound is either healed or filled up with granulations, you will never see the excellent results of this treatment," This explains failure to almost any extent. Professor Lister says that only faith in the germ theory will procure a thorough trial of the practice. Whatever becomes of the germ theory, the results obtained by Lister, Saxtorph, and others are new facts in surgery, or rather physiology, and must have a scientific definition.—*Lancet*, Sept. 17, 1870, p. 411.

54.—THE SUCCESS OF THE ANTISEPTIC TREATMENT OF WOUNDS EXPLAINED WITHOUT REFERENCE TO GERMS.

By Dr. R. T. MANSON, Witton-le-Wear, Durham.

Having adopted and found good reasons for continuing to use what is known as Professor Lister's treatment of wounds, I may go on to state that I entertain serious doubts as to the soundness of the theory upon which it is based. These doubts arose from some cases of wounds in which the "germs" had full access for some time, in which no germicide was used to the surface of the wound, and yet in which no pus was formed.

It is difficult to resist the conviction that the ubiquitous impalpable germ, as difficult to capture as the fairies of old, has, like the "good folks," been debited with much mischief of which it is innocent. Professor Lister's theory is so well known that it is unnecessary to recapitulate it. The theory which I propose is, that the success of Professor Lister's treatment is due to the carbolic acid producing on the surface of a wound a stratum of coagulum which protects the germinal cells below from the deleterious action of the oxygen of the atmosphere, just as the epidermis protects the true skin; and, secondly, to the production of an atmosphere or retention of an atmosphere of carbonic acid in and round the wound.

Whether pus-corpuscles be the descendants of nuclear cells or parasites within them, it is known that pus results from an abnormal growth of germinal or nuclear cell-material—that some obstacle to abnormal growth has been removed, and an increased access of pabulum allowed. In the case of a wound it is clear that the barrier, the scale armour of epithelium, is destroyed, and an increased supply of oxygen admitted. The result is the formation of pus. If this be so, it is evident that if we restore, to as great an extent as we can, the normal condition, we shall be doing the best we can as surgeons. This, I take it, we do by applying the carbolic acid lotion to the surface of a wound. Put a drop of albumen, say white of egg, on a glass slide, and beside it a drop of carbolic acid lotion; observe them under a microscope; let the two drops touch, and at the point and instant of junction a thin film, of what we may call "formed material," coats the albumen, and if the two drops are mixed a solid white mass of coagulated albumen forms on the slide; or, put a drop of saliva, containing epithelial cells, on the glass, and add solution of carbolic acid, the outline of the epithelial scale grows clearer, indicating the change produced. The carbolic lotion, then, changes the nuclear matter of each cell on the surface of the wound to which it is applied into an inert "formed material" protective of the vitalities below, as the epithelium does to what it covers. I need only point to

the well-known fact that the degree of pus formation, and consequent pitting in small-pox, is in direct proportion to the exposure of the part to the action of the oxygen of the atmosphere, to show that such free access does act injuriously.

The primitive surgery of our boyhood, when properties of great virtue were believed to exist in saliva, and when licking or spitting upon a slight excoriation or cut was understood to be a remedy of undoubted efficacy, may have been founded in school-boy instinct; but its value would be explicable on the same principle.

On the value of an atmosphere of carbonic acid to a wound (and such atmosphere must of necessity be induced by the exclusion of common air), I say no more than to point out that it is the normal atmosphere of all covered tissues, and that the old plan of healing wounds by scabbing is the ancestor of Professor Lister's treatment. — *British Medical Journal*, Oct. 15, 1870, p. 407.

55.—ON THE LOCAL APPLICATION OF SULPHURIC ACID IN THE TREATMENT OF CARIOUS AND NECROSED BONE.

By GEORGE POLLOCK, Esq., Surgeon to St. George's Hospital.

[There is nothing novel in the proposal to hasten the separation of dead or dying bone by the application of a strong mineral acid. Sulphuric acid, however, does not appear to have been so generally appreciated as it deserves, nor are its effects sufficiently known.]

My attention was first drawn to the desirability of some such solvent as sulphuric acid in diseased bone, by a case of extensive necrosis of the bones of the skull, the result of congenital syphilis, in a young woman under twenty years of age. She had been the victim of this diseased action in the bones for some years. The discharge was most offensive. A large portion of the skull was exposed and dying; and portions were dead, but not loose. It was evident that a very long period must elapse before the whole of the diseased mass would be separated from the living, healthy bone, if the process of exfoliation was left to nature. I was averse to any instrumental interference for the removal of the diseased portions, from having witnessed untoward and even fatal consequences follow attempts to remove dead bone from the skull by operation. It occurred to me, however, that if by the application of sulphuric acid to the exposed, dying, and dead bone, its solution or disintegration could be surely and gradually effected, much time might be saved, and the removal of the offensive mass be more quickly

attained than if left to the slower work of time. I was led to the conclusion that if bone removed from the body could be rendered soluble or soft by the action of sulphuric acid, a similar result would as surely follow its application to dead bone in the living subject. I therefore determined to have recourse to the application of the acid as an experiment. The following are short notes of a few cases, among a large number, in which the treatment has been adopted.

M. M., aged 19, admitted into St. George's Hospital in March, 1865, with a number of irregular ulcerations, very foul and sloughy, on the scalp and forehead, with much bone exposed and necrosed. The mother attributed the disease to the result of vaccination; but there could be no doubt that it was the result of congenital syphilis, and this conclusion was subsequently confirmed by the fact that one of the younger children became affected with disease of the bones of the palate. The patient was ordered large doses of iodide of potash, and the use of the mercurial vapour-bath, under which treatment the condition of the ulcerated portions of the face and scalp rapidly improved. The exposed bone was touched daily with a lotion of equal parts of strong sulphuric acid and water. This greatly accelerated the separation of the whole of the diseased bone; and she perfectly recovered without any portion of necrosed bone being allowed to exfoliate by its own natural process. The whole was entirely removed by the action of the acid; it crumbled away from day to day in minute fragments until all had disappeared. As the fragments became separated, so soon did healthy granulations fill up from beneath the space previously occupied by the bone. Although much disfigured by the extensive ulceration of the face, &c., the patient has remained perfectly well to the present date.

E. F., aged 15, admitted November, 1867, with a foul, unhealthy ulcer, about the size of the palm of her hand, on the front and middle part of the right tibia. The bone was black and rough to the extent of a crown piece. The disease originated in a strumous node three months prior to admission, and had been a wound one month. She was ordered good diet, cod-liver oil, and quinine. On the 9th of December the bone was first touched with a lotion of equal parts of sulphuric acid and water, and this was daily repeated. On the 11th of February all dead bone was found to have been removed without any other operative interference, and the patient left the hospital on March 18th, with the ulcer nearly healed, and no dead bone to be felt in it.

H. G., aged 27, admitted January, 1867, while phagedæna was very prevalent both in and out of the hospital. On admission, there was a large, oval, ash-coloured ulcer on the front of

the right leg, rather larger than a five-shilling piece. It was attacked several times by phagedæna, so that a large portion of bone was left exposed when the ulcer assumed a healthy character. To this exposed bone strong sulphuric acid was applied on the 1st of March, and by the 11th a large shell of bone had separated, leaving a healthy granulating sore beneath.

H. H., aged 50, was admitted August, 1869, with phagedænic ulcer, of syphilitic origin, on front of the leg. When the phagedæna had ceased, and the wound had become healthy, the tibia was left rough and exposed for more than the size of a crown piece. On August 9th the bone was touched with strong sulphuric acid, and on September 11th the greater portion had separated in a large thin flake, riddled with holes. He was discharged on October 1st, with the ulcer rapidly healing, the surface of bone covered with florid healthy granulations, and no exposed bone to be detected.

W. P., aged 36, was admitted September 1869, with a sinus over the front of tibia, leading down to the substance of the bone, where a portion could be felt dead, but not loose. This was the result of a severe compound fracture of the leg some eighteen months previously. On September 16th the cavity in the tibia was laid open, and some portions of dead bone removed. The cavity, which was now fully exposed, was found to be lined by rough and carious bone. The cavity was ordered to be daily washed out with a lotion of sulphuric acid and water. The walls soon assumed a soft, healthy condition, becoming covered with granulations, and he left the hospital on November 3rd, the cavity nearly filled up, and no exposed bone to be felt.

It is not necessary to multiply instances; were it requisite, many other cases might be related. But the above are, I believe, sufficiently numerous and marked to illustrate the principles and results of the treatment advocated.

I am not aware that the application of sulphuric acid in the treatment of carious bone has been previously adopted in preference to the use of the gouge, actual cautery, or caustic potash, I find no especial reference made to its effects, nor any allusion to its extreme applicability and efficacy in the treatment of caries, in any of the modern treatises on bone.

In referring to the treatment of carious bone, Mr. Holmes says: "Often after free exposure of carious bone, the disease will gradually subside; but when this is not the case, the question occurs whether it will be proper to attempt to remove the carious surface and expose a more healthy one, either by rasping or gouging the bone, or by the application of the actual cautery, or to modify the diseased action by injections, or by applications to the carious part. The injections which are in

use are composed either of iodine or dilute muriatic acid. The latter is intended to unite with the base of the phosphatic salts of the bone, and thus to remove its surface by disintegrating successive portions of it. It has been tried and strongly recommended by M. Chassaignac ('Mém. de la Société de Chirurgie,' vol. iv., p. 286), and no objection appears to exist to its employment in suitable cases; but I cannot say I have found much benefit from its use."

In speaking again of rasping, gouging, and actual cautery, he observes: "These operations should, however, only be performed in cases of evident necessity. We have only too frequent instances of danger of all operations on bones, especially of such as involve the exposure of large surfaces of the cancellous tissue, as is generally the case in these gouging or rasping proceedings, which are extremely apt to be followed by diffuse inflammation of the interior of the bones, osteo-myelitis, and by pyæmia."

In the number of cases which have now come under my notice, both in St. George's Hospital and in private practice, in no one instance have evil consequences been known to follow the application of sulphuric acid to diseased bone of any part of the body; nor has the treatment been found a painful one, when the acid has been used in a diluted form. If pain should follow the application, it usually lasts but a short period; for the acid in contact with the bone soon becomes neutralised, and ceases to occasion uneasiness. When diluted, the acid does not usually affect the soft tissues, even to the extent of uneasiness; nor does it produce the slightest subsequent irritation in them. The acid may be used pure, as in some of the instances quoted. Its application had better then be confined to caries or necrosis of the bones of the trunk when exposed or easily got at; and when it is desirable to destroy dying bone rapidly, or quickly to get rid of dead bone. The results of its application under such circumstances are very satisfactory. But for most other purposes, a mixture of acid with water, in equal parts, will be found sufficiently active and efficacious; and, for the removal of dead bone from the skull, I prefer it should not be used stronger, otherwise it might irritate the dura mater, should the lotion come in contact with it while being applied to the bone; for, in many of such cases, portions of the skull may already have exfoliated or been removed.

If employed for the destruction of carious surfaces in cavities of bones, or deep-seated carious patches on the surface of flat bones—*e.g.*, the pelvis—it will be found very convenient to apply the diluted acid with lint, and either to stuff the cavity with the wetted lint or lay the lint on the diseased patch; or the lotion may be used daily with a syringe. The former is,

however, the preferable method of applying the acid, as its contact with the diseased surface of bone is most effectually ensured, and for a longer period than if the cavity be merely syringed out with the lotion.

On the second or third day, when the lint should be taken out, the cavity in the bone will be seen lined with an opaque white layer of tissue. In a day or two more this may be removed with a pair of forceps; it will peel off the surface of the deeper bone in the form of a more or less thick layer of tissue; it is, in fact, a soft slough from the surface of the bone, from which the phosphate and carbonate of lime have been largely if not entirely dissolved out. If on its removal there be still detected any rough surface of bone, the application of the acid should be repeated, and so often as any portion of exposed rough or carious bone is to be detected. Usually, as soon as one or two layers of slough have separated, healthy granulations commence to spring up from the surface of the bone beneath, and rapidly cover the living bone with a red velvety vascular tissue, which, growing daily, soon fills up the cavity, and closes the wound in the bone.

When the acid is applied daily with a glass brush, or rod, to a necrosed portion of exposed bone, the latter will be seen to disintegrate and crumble away in very small, dry fragments, or may be picked off in minute pieces like friable mortar; or a thin layer may be scraped off in a moist condition, if the attempt is made soon after the application of the acid, and while the surface of the bone is still wet. While the process of disintegration is taking place, and the bone is becoming more porous and perforated with numerous holes, healthy and abundant granulations are forming beneath, and may often be seen sprouting up in these apertures; so that as soon as any portions of bone are removed, or become detached, so soon is the part thus exposed seen covered by this healthy formation of granulations, ready to remedy and close the defect in the bone, and to assist in healing the external wound.

In cases of exposed bone of the skull I have always preferred the daily application of the dilute acid, rather than run any risk of too great and rapid an action by the use of the pure acid. Nor have I hesitated to use the lotion to the bone even when the pulsation of the brain through the exposed dura mater could be distinctly observed close to the edge of the necrosed portion. I have never in any single instance seen the slightest ill effects from the application of sulphuric acid to diseased bone. The more frequently I have used it the more satisfied I have been that it is one of the most valuable agents the surgeon has at his command to assist in the removal of dead bone and to set up healthy action in carious cavities or ulcerated surfaces of the

long bones: valuable not only as perfectly safe when compared with the results of instrumental interference, but also expeditious when compared with the unaided efforts of nature. "The formation of the groove between the dead and the living bone is a very slow process in the bones of the limbs, requiring generally many months for its completion." But by the application of the acid this period in many cases may be reduced to a few weeks, if care and attention be given to the treatment.

Dr. Fitzgerald, of Dublin, has advocated and successfully employed caustic potash in the treatment of carious bone; and there can be no doubt of its advantages over the slow process of time, for it rapidly destroys the diseased portion, ensures its more early separation, and a healthy granulating surface subsequently. But when tested by the side of sulphuric acid it appears to lack one essential possessed by the latter—viz., the acid does not affect or injure the soft tissues when used in the diluted form, although at the same time it acts chemically on the *diseased bone alone*; it does not affect the living bone, and its application is seldom followed by any great degree of pain.

That, in the diluted form, it will only act on dead or diseased bone, and not on healthy bone, is a point of very considerable practical importance; and is the great advantage sulphuric acid possesses as an application, under the circumstances quoted, over the use of the gouge, or of the actual cautery, or of caustic potash. The following experiments, conducted at my request by Mr. Henry M. Noad, lately my clinical clerk, satisfactorily prove the correctness of this statement.

Portions of dead, diseased, and healthy bone were selected and subjected to the action of sulphuric acid—viz. :—

1. Dead bone: 10 grains.
2. Diseased bone: 10 grains.
3. Healthy bone; middle age: 10 grains.
4. Healthy bone; old age: 10 grains.

Exposed to the action of a mixture of sulphuric acid and water, one part in four, for three days, at a temperature of 100°, the following were the results:—

1. Dead bone: Phosphate of lime, 2 gr.; carbonate of lime, 3·30 gr.; dissolved in the mixture.
2. Diseased bone: Phosphate of lime, 2 gr.; carbonate of lime, 1·3 gr.; dissolved in the mixture.
3. and 4. In both specimens of healthy bone, *no action took place.*

The process of disintegration or dissolution, with the commencement of healthy granulation from the surface of the living bone, may be observed simultaneously progressing, in any exposed surface of dead or dying bone to which the acid

may have been applied. When its action and effects are compared with those of the gouge, the bruising which is necessarily produced by the use of the latter, the pain and frequent subsequent inflammation, and, even under the most favourable circumstances, the time required for the rough lacerated surface to recover itself, throw off its small bruised fragments, and become covered with granulations, the treatment by sulphuric acid will be found far preferable.

“Hitherto,” says Mr. Holmes, “we have been considering the usual method of separation; and, as this is a long and tedious process, seldom completed under many months in the case of a large sequestrum, and often dating by years, it is not surprising that efforts should have been constantly made to anticipate the period of cure by accelerating the separation of the diseased bone. These, however, have resulted in disappointment. The process must be left to find its natural completion in the spontaneous separation of the dead bone from the living; and any attempt to effect this by art—*i.e.*, to detach the necrosed portion and to cut it away from the living parts—only extends the area of the disease and endangers the preservation of the limb. Special considerations applicable to some regions of the body, such as the skull, may indeed induce a surgeon to operate on necrosed bone before it is loose, for the relief of matter pent up below it. Such operations, however, are not undertaken with a view of curing the diseased bone, but of restoring the functions of organs secondarily affected.”

It must not, however, be considered, from what has already been said about the application of sulphuric acid, that it is intended to convey an idea that instrumental interference in the treatment of necrosis or caries will be no longer necessary. This is far from my object. Numerous will be the instances in which the surgeon must mechanically interfere for the removal of necrosed bone or for the exposure of carious cavities. The real merits of the treatment lie in the limitation of the action of the acid to the diseased bone, in the perfect safety of the application, and in the fact that it produces no irritation in the soft parts. The limitation of the action of the acid may be considered proved by the experiments recorded; its safety is especially exemplified when applied to diseased bone of the skull, and where it is most desirable not to interfere with instruments; and its beneficial effects will be observed when applied to carious surfaces or necrosis in the long or short bones. It will also be found especially useful in the treatment of necrosis of the jaw, not only from the fact that it hastens the removal of the dead bone, but, from its antiseptic qualities, it greatly modifies the abominable fetor which infects the breath of patients afflicted with this malady.

The application of the acid in diseases of the bones of the skull renders unnecessary all force or violence in a very critical condition of parts, and in which very slight local disturbance may be followed by severe consequences. The application of the acid in caries or necrosis of the long or short bones will often save the employment of the gouge, and consequently all bruising of the living surface of the bone. The surgeon with the gouge will cut away dead and living bone; he cannot to a nicety determine the depth of the carious layer. The acid disintegrates only the dead or dying surface, and appears to stimulate the healthy bone to a condition which enables it to assist rapidly in its own reparation. The application of the acid may therefore be frequently requisite without any operative interference; it will also be constantly advantageous after the use of instruments in the treatment of diseased bone.

The antiseptic qualities of the acid are no small recommendation to its use. The foul and offensive discharges so constantly accompanying diseased bone become at once altered in character by it, and in a short time all disagreeable smell usually ceases.—*Lancet*, May 28, 1870, p. 762.

56.—SULPHURIC ACID IN THE TREATMENT OF CARIOUS AND NECROSED BONE.

By FREDERICK KIRKPATRICK, Esq., Dublin.

[This short paper was elicited by the preceding article by Mr. G. Pollock, in which its author is alluded to as “Dr. Fitzgerald.” Mr. Pollock had misunderstood his ideas as to the use of potassa fusa as an application to diseased bone.]

The caustic which I have recommended, and which I have used for so many years with such success, is the potassa cum calce. I have had it made in longer and thicker sticks than as usually supplied to the profession, and I employ it not only in the advanced stages of carious and necrosed bone, so well described by Mr. Pollock, but for the still more important purpose of cutting short the first stage of disease in bone, or that of acute osteitis.

No good surgeon hesitates to cut down and divide fasciæ, sheath of tendon, or periosteum wherever there is acute pain and deep-seated inflammation; but inflammation of the interior structure of a bone is, in general, allowed to go on for months or years until softening of its structure, abscess, and the other well-known disastrous effects are produced.

For several years I have promptly interfered in all such cases by cutting down and inserting a caustic tunnel into the spongy tissue of the distended and inflamed bone. In operating I use

the knife and a pointed piece of the caustic alternately, first cutting, but not deeply, then using the caustic with some pressure or force, and so alternately until the bone is reached, when a trocar, auger, gimlet, or drill is used to penetrate through the compact tissue; the caustic is then again introduced to the bottom of the opening made into the cancellous structure. Prompt relief follows, and a thin, reddish serum continues to flow from the opening until a healthy suppuration takes place.

In this manner I have perforated the great trochanter in 13 cases of morbus coxæ; three of the patients are at present to be seen in the hospital of the North Dublin Union, and the others were exhibited to one or more of the hospital surgeons of Dublin.

This system of bloodless surgery by the alternate use of the knife and the potassa cum calce I have found of the greatest advantage for getting through the thickened and vascular structures over necrosed and carious bone, in dividing the contracting bands resulting from deep burns, also for the destruction of epithelial cancer and other morbid growths.

As considerable pain is produced, chloroform should always be used, except in the case of the smaller articulations, when the ether spray may be substituted.—*Lancet*, July 9, 1870, p. 71.

57.—ON THE TREATMENT OF GANGLIONS.

By FREDERIC C. SKEY, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

[These little cysts, which occur on one or other of the numerous tendons at the back of the wrist are often treated in a rough fashion by rupture with a blow from the back of a book. This plan is however very unsatisfactory. The following plan rarely fails to effect an early, if not an immediate, cure.]

The object is to evacuate the *entire* contents of the cyst, and to bring its opposite surfaces into perfect apposition with each other. It is a small operation; but on the delicacy of its performance its success materially depends. Bending the hand forwards, in order to tighten the skin over the cyst, pass vertically into the centre of the tumour a broad-shouldered lancet. By a lateral movement of the instrument the orifice will be dilated, and the contents will freely escape. Now it is indispensable to the obliteration of the cyst that the whole of its contents should be evacuated—every drop and every fraction of a drop, to effect which the sac must be compressed and kneaded in every direction. Then apply a well-made thick compress of lint, and strap it down tightly with good plaster, and, lastly, a

roller may be applied. In forty-eight hours the wound has healed, and the ganglion is seen no more.

In cases (and I suppose I have operated on a hundred) in which the operation I have described failed to cure the disease, the ganglion, as it will do when of long standing, had burrowed under the tendon. In one of these I attempted to dissect it out; but, in so doing, I denuded the tendon of its natural investment, and the result was permanent union between the tendon and the integument. I never recall the circumstances of this case, and it occurred upwards of twenty years ago, without painful regret. The larger examples of a similar affection to the above—in which the synovial sac, probably the anterior one, which extends beneath the anterior carpal ligament into the palm of the hand, is the seat, and from which abundance of small melon-pip like bodies are obtained—may be treated on the same principle. But the subsequent pressure must be great.—*Lancet*, Aug. 27, 1870, p. 285.

58.—THE TREATMENT OF HOUSEMAID'S KNEE.

By CHARLES ROBERT THOMPSON, Esq., Westerham.

I believe that the treatment of inflamed bursa patellæ by the plaster of ammoniacum and mercury is not so generally known and accepted as it deserves to be. The following cases are selected from several in which I have used it with success, and require no comment.

Case 1.—June 20th, 1867. E. J., a young carpenter, came to me with a very largely distended bursa over the left patella, as large as half a cricket-ball. It had been so about ten days, with not much pain or inflammatory symptoms. I had it covered at once with the plaster spread on leather. On July 5th, there was great improvement. The hot weather made a fresh plaster necessary. On the 12th, the swelling was entirely absorbed. He had continued to work throughout, and was now cured.

Case 2.—S. S., a labourer, came to me on November 10th, 1869, with the bursa patellæ acutely inflamed. There were great pain, numbness, and heat. I sent him to bed, and had constant hot fomentations applied for two days to subdue the acute symptoms. On the 12th, the plaster was applied. On the 16th, he was covered with erythema the irritation commencing and spreading from the plaster. A cooling saline draught was ordered. On the 23rd, he walked four miles to see me. The knee was quite cured.

Case 3.—On July 18th, 1868, a housemaid awoke in the night with acute pain at the knee. I found great pain, heat, and

tenderness over the patella. The bursa was much swollen. She was feverish and ill, and was ordered to remain in bed and keep the knee covered with spirit lotion. On the 23rd, the acute symptoms had subsided. The bursa was very distended with fluid. The plaster was applied. On the 30th, the swelling was entirely absorbed. She was at work again.

Case 4.—On Jan. 18th, 1870, W. M., a carpenter, came to me with a large inflamed bursa over the left patella. It was painful in walking, and had kept him awake two or three nights. There was tenderness on pressure. The plaster was applied. On the 27th, I found the fluid almost absorbed; and on Feb. 3rd he was quite cured,

Case 5.—Mrs. C., a coachman's wife, accustomed to scrub a brick floor, consulted me on May 28th, 1870, with great enlargement of the bursa patella, which was also painful and tender. After one night's thorough fomentation, she applied the plaster. On June 4th, there was great improvement; and on the 18th she was cured.

Case 6.—On July 9th, 1870, Mr. L., an old farmer, a very religious dissenter, and as he said, "pretty often on his knees," came to me with great enlargement of the bursa patellæ, communicating with a large bursa over the head of the tibia, forming a large double swelling. He found great difficulty in moving about, but had not much pain or tenderness. The plaster was applied at once. On the 16th, the swelling was rapidly diminishing; and on the 21st he was almost cured, and did not attend again.—*British Medical Journal*, Oct. 15, 1870, p. 411.

59.—ON ABSCESS IN DIFFERENT LOCALITIES.

By FREDERIC C. SKEY, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

There is no disease more universal than abscess, and none that demands from the surgeon clearer pathologic views, and the consideration of which will afford you material for much profitable reflection. It is scarcely necessary to define an abscess. It is a collection of pus contained in a sac or cyst. It may be preceded in its formation by a deposit of solid lymph, greater or less in magnitude; or an abscess may form without previous indication of its existence. Such examples are not infrequently found under the skin, and in various parts of the frame, following diseases which exert an unusually depressing influence on the system—such as fever, dysentery, phthisis, &c. This latter variety is invariably the product of extreme debility. Now, is this purulent deposit in the tissues of the body the result, as is too

often supposed, of real inflammation—that is, of an active hyperæmia—or not? Assuredly it is not. It is associated with, and, more than that, it is the product of, a weak condition of the arterial system, and necessarily of all the vital powers. You will find the pulse, when the disease is extensive, weak; for, even if full and large in calibre, it is readily compressed. I wish you especially to recognise this feature in the formation and progress of simple abscess; the indications of weakness being, of course, greater when the abscess is large. The greater the debility the larger the abscess, and the slower its progress towards both maturity and recovery.

You will naturally infer, then, that all abscesses occurring spontaneously, or rather without external and obvious causes, demand treatment by tonics and stimulants, and of such I select especially bark and wine. There is no remedy in the Pharmacopœia so potent in producing suppurative action as bark, and of all forms the simple tincture is the most efficient, in full doses of two or three drachms diluted with water. By the term suppurative action, I understand the conversion or breaking down of a mass of lymph, itself quite incapable of removal by the absorbents, into fluid pus—in fact, into abscess.

There is no form of abscess more illustrative of these truths than the disease when situated on the mammary gland, on which I have so often spoken in this theatre. It appears in weakly constitutions following long and severe confinements with loss of blood, or a low and innutritious diet, erroneously supposed to act as a preventative to inflammation, which, in truth, it actually fosters.

I speak of common *mammary abscess*, which appears at varying periods after confinement, in its first stage of deposit of lymph, when occupying a greater or less portion of the entire gland. Now let me assure you that we have no means within the circle of our present knowledge of obtaining the absorption of this solid mass or throwing it back on the constitution. Neither iodine, nor leeches, nor fomentations, nor purgatives, or other supposed remedies confidently proposed by young medical men, who, unfortunately, observe little and think less, are at all available to good. Yet you are aware that they are the agents which two-thirds of you at least would resort to; I am sure of this, for I am told so at every College examination, Pray understand the absolute impossibility of getting rid of this once deposited mass by the means alluded to, and you are all prepared to adopt. I will not go so far as to say it may not be at least partially dissipated by absorption, but not by your means.

The proportion of the deposit that may be absorbed depends on the stage it has arrived at. If much advanced it will pass on almost entirely into suppuration. It has already entered on that of suppurative action; it will not remain stationary, and it must advance; but whether its progress towards its necessary consummation be slow or rapid, depends on your treatment. I say, in all abscess give bark freely, and generally wine; and the larger quantity of each that your patient can bear, the earlier will this solid mass break down in the centre and form a large abscess, which when matured, and not before, should be freely laid open with the knife. If the deposit be recent, and the disease treated early on this sound principle, a portion of the mass will be taken up by the absorbents, indicated by the disproportionate quantity of pus to the large mass that has produced it.

Perineal abscess often presents itself in the form of a small rounded, hard tumour, by the side of the urethra in the perineum, of about the size of a marble. Whatever you may suppose, or have been told to the contrary, it will answer, in my opinion, no useful purpose to adopt, in this form, any other treatment except that I have recommended to you in the case of mammary abscess. I do not consider it at all necessary to the true pathology of this disease that it should be based on any lesion of the urethra. It is not necessarily, nor by any means invariably, the result of urine infiltrated into the cellular tissue. It results from irritation conveyed to this tissue by the use or abuse of instruments employed in the treatment of stricture, real or supposed. When pus is thoroughly formed—and it is a great object of treatment to attain this end as early as possible,—do not open the canal of the urethra, if urine does not pass through the wound. Should it do so there would appear to be even less necessity for this extension of the incision.

It is not always an easy diagnosis to determine whether fluid about the *knee-joint* is within the cavity of the articulation or without it. As a rule the diagnosis is readily attained in these cases. You will tell me that when the fluid extends over the patella, the disease consists of abscess around the joint; and when the patella is raised, and is pushed up by fluid underneath it, the collection is within the articulation. That is all very true. But in many cases the fluid, although confined to the joint, is not sufficient in quantity to raise the patella, and therefore you cannot always depend on that particular evidence; and in the other case, in which, consequent on the greater tenacity and closer adhesion of the integuments to the fibrous tissue upon the patella, I have seen several examples of what I have called the horse-shoe abscess around the knee—viz., when

the matter has travelled round three sides of the patella without extending over it. Such cases are very deceptive. In forming your opinion—and a correct judgment is often indispensable to the recovery of your patient—you would, of course, place your greatest reliance on the local examination by the hand, and, this proving insufficient, weigh deliberately the evidence in favour of one or the other locality. If the fluid be in the joint, it may be a more serious affection, and the constitution takes cognisance of it as such. If external, probably the formation of abscess has been preceded by some local injury of a superficial kind, involving the cellular tissue, and in which the condition of the skin itself may add its testimony.

I now come to abscess on a larger scale. *Abdominal abscess* presents itself in the form of a large tumour, occupying the lower part of the abdominal walls, and commonly extending from the ilium towards the mesial line of the abdomen. The size is sometimes immense. It is firm, solid, and unyielding on pressure, but not very painful. I have known it on several occasions to be mistaken for malignant disease. It will remain stationary for a long period, and when it breaks down into pus, the fluid will extend in various directions, backwards towards the loins, almost invariably along the course of the femoral vessels to the extent of four to six inches; while it occasionally breaks its way through the sacro-ischiatic foramen, and forms an immense tumour on the gluteal region. This disease may be said to place life itself in jeopardy, not merely from its magnitude, but from the depressed condition of the system that produces it. In this feature it resembles carbuncle. I will tell you briefly some few particulars of the first case I ever saw. It occurred to a gentleman of advancing age, who first detected the disease while on a journey in Wales. He consulted a surgeon, who reported to his family that his disease was malignant. He consulted a second authority in the west of England, who echoed the opinion of the former gentleman, and advised his immediate return to London. I saw him in consultation with his friend, the late Dr. Rigby, on the day following. Other medical men were present. My reason for entertaining a doubt as to the malignant nature of the disease was based on the fact of its very recent appearance, which seemed to me fatal to the supposition of malignancy. I considered it a prospective abscess, and I gave him bark and good nourishing diet, with wine. In the course of ten days the swelling increased largely, and I thought I felt fluctuation. In the presence of several medical men, and in the confidence of my opinion, I punctured the tumour through the abdominal wall; nothing but blood followed the puncture! I then ordered brandy in place of wine, and turtle soup, and a thoroughly animal diet. In four days I

again punctured freely, and evacuated about eighteen ounces of healthy pus. He recovered in a month.

In March last I saw a gentleman, aged 75, with a large tumour in the abdomen, occupying the right side, and extending from the iliac fossa. I was told by the family medical attendant that his patient was the subject of malignant disease, and that he had been visited by two eminent physicians (and they were both men of deserved eminence), who had pronounced his case hopeless from this cause. With some difficulty, I convinced his medical attendant that the great probability was in favour of abscess; and with his concurrence, I gave him large doses of bark, and about a pint and a half of port wine daily. Within one week at least one-third of the abdomen was swollen and red, and the hand readily detected large fluctuation of pus, of which fact my colleague was as convinced as I was; but his family objected to an operation, and the poor gentleman carried his abscess to his grave. His attendant nurses were confined to the members of his family, and belonged to the amateur class. Such nursing is not very infrequently fatal to life.—*Lancet*, July 23, 1870, p. 111.

60.—IODINE AS A TOPICAL APPLICATION TO WOUNDS.

By Dr. JAMES STIRTON, Glasgow.

In December of 1869 I was compelled, owing to the failure of other methods of treatment, to try the injection of a strong tincture of iodine, in a case of dropsy of the knee-joint, with a good and apparently permanent result. About the same time there came under my notice a case of fistula in ano (a highly strumous subject), which had recurred again and again, after thorough division by the knife, and with such aggravations that the patient's life was rendered miserable. At my wits' end I tried injections of iodine, after getting the system as well regulated as possible, with good results for a time; but a recurrence of the discharges with all the attendant painful symptoms, induced me to incise pretty freely in the usual way, and afterwards impaet into the cut surface an ointment containing a large proportion of iodine. No disturbance of system ensued, but a rapid healing without union, and no return after an interval of four and a half months.

The next case wherein I used iodine was a serofulous abscess in the groin. I injected a solution of two grains to the ounce of water, with the addition of a little iodide of potassium, every twelve hours for three days, when rapid contraction and healing ensued. Success in this case rendered me bold, and I now began to use iodine as a topical application to wounds of all sorts, in-

cluding ineised, and much in the same way as carbolie acid is used. I was astonished at the results. I still employed the solution containing two grains to the ounce of water. The first instance of this application was after exeision of a small tumour. I confess it was with some fear and trembling I squirted the solution on the cut surface, but the glazed appearance immediately assumed, and the rapid healing by the first intention, both surprised and delighted me. At this stage I happily induced Mr. Wilson, of the Veterinary College here, to try the use of iodine on various animals, and with the same happy results in the great majority of instances. It is no uncommon request now, on the part of grooms and others, to have the "brown bottle" to apply to abraded surfaces, &c. As there is every probability of his publishing a detail of his cases under this treatment, I forbear giving any from the horse.

I have not yet had sufficient experience to enable me to determine how strong a solution or ointment may be employed locally—of course, other solvents than water being employed—but the presumption is in favour of strong applications; at least, no general disturbance of the system has hitherto ensued, while good results have been obtained in two or three almost desperate cases.

There are two or three considerations why iodine should hold as good place as, if not better than, carbolic acid as a topical application.

1st. Its well-known action, in whatever part of the body, of determining just that degree of congestion (or call it what you will) of the surface which is attended with the production of such a degree of plastic lymph best suited for adhesion of parts in contact.

2nd. The well-known destructive effect it has on all the living germs that float in the atmosphere, or are carried in water, such as the so-called monads, vibrios, &c. I mention this as the germ theory of many of our acute diseases is now rampant. Query: Might not the application of iodine obviate to a great extent, at least, the spread of hospital gangrene?

3rd. Being one of the elements, or at least a very stable substance under any reaction whatever, it is not liable by contact to enter into any unknown, and it may be deleterious, chemical compounds with the living tissues, as carbolic acid may presumably do.

4th. As shown in one instance, at least, it has a wonderful power of separating dead or dying tissue from the living and active. I allude to the case of a carbuncle on myself, where I was gratified with the result.

I might, of course, enlarge considerably on this head, but as the subject is purely speculative, I forbear, and conclude with

the hope that others may find, under its action, as good results as I have done.

I may mention that phosphorus has similarly engaged my attention to a small extent, but as I am not in a position to pronounce definitely concerning its local action, I desist at present.—*Medical Times and Gazette*, Sept. 3, 1870, p. 265.

61.—THE HEALING OF WOUNDS BY TRANSPLANTATION.

By GEORGE POLLOCK, Esq., Surgeon to St. George's Hospital.

Pending the final results of Mr. George Pollock's experiments, which are now being carried on in St. George's Hospital with a view to determine the possibility of considerably hastening the healing over of ulcerated surfaces, and especially such as result from severe burns, by the transplantation of healthy epidermis to the ulcerated surfaces, according to M. Reverdin's proposal, we think it will be interesting to our readers to give a general summary of the mode of operation, and the actual results of this new procedure in conservative surgery. On hearing of the experiments of M. Reverdin, Mr. Pollock determined to attempt to heal, by the transplantation of healthy skin into its midst, of an extensive ulcerated surface in the case of a child in St. George's Hospital who had been severely burnt on the thigh, from hip to knee, some eighteen months previously, and whose case we have now carefully examined. The child in question is eight years old, and the ulcer on the outside of the limb is in general outline club-shaped, the smaller part being situated at the knee, and the larger portion above. The ulcer is nearly eighteen inches in length, and about twelve inches across at its widest part. The case, on admission, appeared almost hopeless, as far as permanent cicatrization was concerned; the ulcerated surface had been in much the same state for months past, and would certainly have taken another year or two to heal, if it would have ever healed, under the usual form of treatment adopted in those cases. The healing process had advanced to about an inch and a half from the original margin of the burn from either edge. Two months ago Mr. Pollock transplanted to the granulating surface of the ulcer two pieces of the child's own skin, the size of millet-seeds, taken from the side, just above the ilium. An incision was made in the granulations, the piece of skin embedded therein at once, and then covered over by a piece of adhesive plaster. At the end of a week there was nothing to be seen of the transplanted skin, and to all appearance the experiment was an entire failure. At the end of a fortnight two small isolated spots of something like cicatrization could be detected at the

points where the skin had been embedded. These now began to increase in diameter more rapidly than one could have imagined or expected; so much so that at the end of five weeks they were quite conspicuous, like islands in a sea of granulations, and they were rapidly increasing in circumference. Mr. Pollock now transplanted three more pieces to the other portions of the ulcer. Two of these at the end of a fortnight were evidently commencing to send forth circular patches of cicatrization, and they are now well marked, and daily increasing in size. The third portion has also taken, but did not make itself evident so early as the other two. On Sunday last, at our visit to the case, we observed that one of the original implantations has resulted in nine weeks in bridging completely across the lower part of the ulcer, near the knee. New skin in the form of a patch two inches by one and a half, and a second island of new skin two inches in diameter, had been produced higher up from the second of the original transplantations. One of the transplantations performed five weeks since had given rise to a third islet about the size of a shilling. The new portions of integuments are at present devoid of sensation to any foreign body or to touch. The case promises to do thoroughly well under the new surgical procedure, which, if successful, must mark a new era in the treatment of extensive burns by preventing the sad deformities and the long exhausting illness which so often follow them. Apart from the interesting practical considerations connected with these curious and remarkable results, there appears to be one point having a very important physiological bearing, and that is the nature of the new growth. How from so small a point of skin could such patches of cicatrization or new structure and covering arise? And why should the process of healing be greater around the newly-implanted skin than at the margins of the original ulcer? Was it the simple result of epithelial cell growth started by the implantation of a few healthy epithelial cells in a nidus congenial to their life, reproduction, and increase?

To endeavour to throw some light on this point, Mr. Pollock took advantage of a hint from Dr. W. Ogle—viz., to implant a minute portion of black skin at one point of the granulating surface, and observe whether cells containing pigment were propagated in a manner similar to that which followed the ingrafting of the white skin. There has not yet been sufficient time to test the results of this last experiment.

The portion of skin removed in each instance was about the size of a millet-seed; indeed, the success of the experiment seems to depend essentially on the minuteness of the piece transplanted. Mr. Pollock has further taken from his own arm a small piece of skin, and implanted it in a patch of the

granulations, to test whether there will be any difference observable hereafter between the patches of skin transplanted from the child's own body and that taken from another person; and, by the way, this disposes of the question of cruelty, for the operator has not failed to deal precisely the same with himself as with others. Mr. Pollock has operated upon a second case, and, we hear, that he will continue the experiment on others.

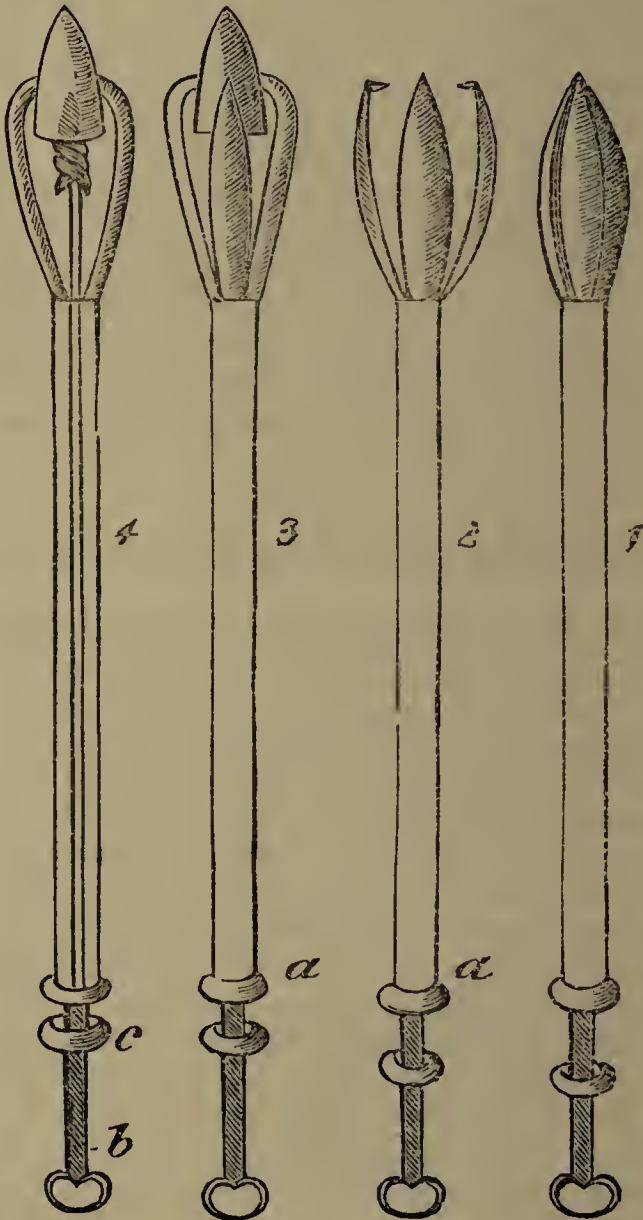
Of one thing there can be doubt in reference to Mr. Pollock's case, that, whereas the healing process had extended only a certain distance from the edge of the healthy skin, and whereas the closing up of the ulcerated surface must have taken place rather by contraction from both sides of the already-formed cicatricial tissue than the spreading formation over it of epithelial tissue, new centres whence large patches of new integument spread have been formed by the transplantations of skin practised by Mr. Pollock after the manner followed by M. Reverdin; and the result must be, if nothing hinders the repetition of the operation, that the wound must heal over in a much shorter time, and with much less suffering than usual, and without deformity consequent upon the free contraction of the cicatrix which would otherwise form. — *Lancet*, July 9, 1870, p. 62.

62.—DESCRIPTION OF A NEW BULLET EXTRACTOR.

By Surgeon T. E. TUSON, M.D., Bengal Medical Staff.

I am desirous to bring before the profession a bullet extractor invented by myself some years since, and which has not as yet, for want of opportunity, been fairly tried by army surgeons. A long experience in gunshot injuries inclined me to have an instrument made which would in its shape and conformation be similar to a probe, and combine in its mechanism prehensile powers to seize a bullet the moment its situation was felt by the surgeon. This instrument was therefore made in the shape of a probe with three blades at the end which shut completely, so that it might be introduced into a gunshot wound with perfect facility. I believe that most surgeons on the field of action have felt the difficulty of finding a bullet, and to have frequently experienced the annoyance after ascertaining its position, on searching for it with the bullet forceps now in general use to have found it had slipped away into adjacent cellular tissue or sheath of a muscle. The blades of the instrument open or shut at the surgeon's discretion, and the moment the situation of the bullet is indicated by the sense of palpation, it can be seized by the operator. In addition to this a centre screw passes through the instrument, which on being revolved enters

the bullet and fixes it so firmly that it can be extracted, even if it be impacted in a bone. The screw cannot injure surrounding tissues, as it works between the blades of the forceps, in the hollow space produced by their convergence. I believe this instrument will be found useful in the present war, as it is portable and light. The forceps now used in our army cases are so inadequate for the purpose that I think an improvement on them will be considered a desideratum.



Description of the Drawing.

1. The instrument with the blades closed.
2. The blades of the forceps open by pulling back the shaft of the instrument A.

3. The blades of the instrument represented grasping the bullet by pushing forward shaft A.

4. The screw in centre of the shaft of the instrument represented entering the bullet. This is done by twisting round screws B C a small running screw button, to indicate the distance the screw passes through shaft of the instrument.

This bullet extractor is made by Mr. Pratt, Oxford Street.—*Medical Times and Gazette*, Aug. 6, 1870, p. 152.

63. —ON THE TREATMENT OF DISTENSION OF THE FRONTAL SINUS FROM PENT-UP SECRETION OR PUS, WITH TWO CASES, AND ILLUSTRATIONS.

By GEORGE LAWSON, Esq., Surgeon to the Royal London Ophthalmic Hospital, Moorfields, and Assistant Surgeon to the Middlesex Hospital.

[The deformity from displacement of the eye is so great in cases of this nature that an efficient plan of treatment is absolutely necessary. A communication is to be established between the interior of the cyst and the cavity of the nose, so that by continued drainage and the application of local astringents, the walls of the cyst may gradually contract.]

A single curved incision parallel with the fold above the lid is to be made over the most prominent part of the tumour, and having by a little dissection exposed its surface, the scalpel should be plunged into it, and an opening made to the extent of the incision. The index finger of the right hand is now to be pushed into the sinus through the wound to ascertain the size of the cavity, and if there is any necrosed or carious bone. Whilst thus exploring the sinus, the little finger of the left hand should be passed up the corresponding nostril, and an endeavour made to find out the spot at which the tip of the finger in the sinus will approximate most closely the end of the one in the nose. After a little search it will be found that at one part the fingers will almost meet, there being only a thin plate of bone between them. Having gained this information, the finger in the frontal sinus is to be withdrawn, but that in the nostril is to be retained *in situ* to act as a guide to the gouge or elevator, which is to be passed into the sinus and made to force a passage into the nose through the lamina of bone on which the tip of the little finger is resting. A communication between the frontal sinus and the nose having been thus established, an india-rubber drainage tube with holes cut at short

distances is to be introduced, one extremity of which is to be afterwards fastened on the forehead, whilst the other end protrudes slightly from the nostril.

The easiest way of introducing the drainage tube is to pass a probe with an eye up the nostril and out of the wound, and having fastened the tube to it by means of a piece of string, to draw it back again through the nose.

The object of the drainage tube is to keep the channel between the two cavities from closing, and to enable the attendant to wash out the frontal sinus at least twice a day with some astringent and disinfectant solution.

Case 1.—John C., aged 58, came under my care at the Royal London Ophthalmic Hospital on March 12, 1869, on account of the large tumour at the inner side of the orbit.

The patient dates his present affection from a kick he received on the left eyebrow from a horse when four years old, fifty-four years ago. There is still remaining as the result of the injury a depression of the bone over the left eyebrow, and a scar on the inner side of the nose. The left eye is considerably displaced by the tumour; it is half an inch further from the nose, and nearly an inch lower down in the face than its fellow of the opposite side. The eye is projected outwards, and the patient is unable by any effort to draw it inwards. The inner half of the field of vision is lost, but in the outer half he can count fingers, although he is unable to read any sized type. On the left side of the bridge of the nose there is a smooth, round, elastic swelling about the size of half a large walnut protruding from the inner side of the orbit. It varies in size, being much smaller when he gets up in the morning, and larger when he goes to bed at night. There is no pain in the tumour, nor in the scar of the old injury.

On the day of the patient's admission into the hospital I performed the operation I have described, and passed an india-rubber drainage tube through the distended sinus into the left cavity of the nose and out of the corresponding nostril. The contents of the cyst consisted solely of a thick dark glairy fluid, evidently the pent-up accumulation of many years' secretion of the lining membrane of the frontal sinus. A very slight amount of irritation followed this operation, and the patient in a few days expressed himself greatly relieved of the sense of weight which had lately oppressed his brow. A free discharge drained through the tube, which was shifted twice a day, and previous to each shifting the cavity of the cyst was thoroughly cleansed with a solution of carbolic acid, $\mathfrak{M}iv$ ad aquæ $\mathfrak{z}j$, which was squirted into the sinus through the drainage tube.

Gradually the discharge diminished in quantity; and as the cyst walls contracted, the eye regained to a great extent its proper position within the orbit. The tube was worn for nearly eight months, when, as all discharge had ceased, it was withdrawn. After the removal of the drainage tube there was left a fistulous opening at the inner angle of the orbit, which may possibly require a slight operation to effect a permanent closure.

Case 2.—Aliee S., aged 21, came under my care at the Ophthalmic Hospital, on April 6th, 1869, on account of a tumour on the inner side of the orbit which projected the eye downwards and outwards.

The girl states that about six years ago she noticed a swelling at the inner side of the left orbit, close to the bridge of the nose; it was small and soft to the touch, and varied in size, being larger at one time than another; it gradually increased until it attained the dimensions shown in the drawing. The sight of the eye is good. She can read No. I. with ease at 12 inches, and No. XX. Snellen at 20 feet. Her mother thinks that the swelling originated in a severe attack of erysipelas which she had when she was six years old. On two occasions the tumour has been punctured, and each time a thick fluid was evacuated.

After her admission into the hospital, I performed on this patient the same operation as in the preceding case, and succeeded in introducing a drainage tube through the distended sinus. After cutting into the tumour, my finger passed readily into a large cavity, the dilated frontal sinus, in which I detected a small portion of necrosed bone, which was, however, too firmly adherent to the living structure to be detached. The contents of the cyst consisted partly of the same dark glairy fluid as was found in the first patient, but partly also of pus, with which the dark fluid was freely streaked. It is very probable that through the free channel now established between the frontal sinus and the nose the portion of necrosed bone will escape after it has become detached.

The after-treatment consisted in daily shifting the tube, and in washing out the cyst at first with a solution of carbolic acid $\mathfrak{M}\text{iv}$ ad aquæ $\mathfrak{z}\text{j}$.; and afterwards with a lotion of glycerini acidi tannici $\mathfrak{z}\text{j}$., ad aquæ $\mathfrak{z}\text{vii}\mathfrak{j}$. The patient progressed most satisfactorily, and after a few weeks returned to her home, where she continued to wear the tube for nearly six months. The last account I received from her was accompanied with a photograph, which was taken just before the tube was withdrawn. She was much improved in appearance, and the eye had returned to its proper level within the orbit.—*Practitioner*, July 1870, p. 8.

ORGANS OF CIRCULATION.

64.—UPON ARREST OF ARTERIAL CIRCULATION IN A LIMB BY MEANS OF OVER-FLEXION.

By Dr. GEORGE Y. HEATH, Surgeon to the Newcastle Infirmary.

[The following is part of the address in surgery delivered at the annual meeting of the British Medical Association at Newcastle last year.]

The power exerted by the bent position of a limb, or over-flexion, upon the blood-stream, first came under my notice a good many years ago in this way. In the year 1848 or 1849, a travelling jeweller, who had a booth at one of the periodical fairs in this town, having occasion to get up in the night, struck his leg, whilst walking across his booth, against the sharp projecting end of the broken top of one of his jewel cases. He fell to the ground in a fainting state; and Mr. Featherstonhaugh, a surgeon here, was hurriedly sent for to see him. Mr. Featherstonhaugh found a punctured wound high up in the leg, passing deeply between the bones, and bleeding furiously; being alone in the middle of the night, and without instruments, no operation could be attempted; and he endeavoured to stay the bleeding by plugging. This was utterly impossible; in spite of his efforts, the blood continued to well up from the wound like water from a spring. Mr. Featherstonhaugh was at a loss for a time what course to pursue, when it occurred to him to bend the leg forcibly upon the thigh; the flow of blood was at once slackened, and pressure by pads now easily arrested the hemorrhage. The bent position was not kept up in this case, and bleeding recurred, on account of which I saw the man with Mr. Featherstonhaugh; and ultimately the anterior tibial was ligatured at the wound, and a piece of broken glass removed from the interosseous membrane. This case was reported in the *Lancet* at the time, and was quoted by Mr. Guthrie in his lectures at the College of Surgeons, as a good example of his own principle of treating wounded arteries. The point in the case, however, which I now wish to notice, is the marvellous effect produced by bending the knee. This effect was never forgotten by me; and since that time, but more particularly of late years, I have frequently had recourse to this expedient to stay arterial bleeding, sometimes temporarily, often permanently. For some time I hesitated to trust to this proceeding alone. Latterly, however, I have frequently done so, and have treated wounds of all the vessels of the forearm; of the radial, in the middle of its course, and near its termination, between the metacarpal bone of the

thumb and that of the forefinger; of the ulnar and its upper third; of the superficialis volæ and the palmar arch, by flexion of the elbow. I have not had such frequent opportunities of testing this means in the lower extremity, but have employed it occasionally to restrain secondary bleeding from stumps, with marked success, and also in a case of malignant disease in the lower third of the tibia, where profuse hemorrhage followed an exploratory incision.

A French surgeon has recently impugned the efficacy of flexion as a blood-stopping means. I have therefore had some experiments done at the Infirmary here, with a view to test the effect of this position upon the pulse at the wrist, and at the ankle.

These experiments were done at different times, and on several different individuals, by Dr. Page, our excellent house-surgeon; and by myself separately, with the assistance of Mr. Kaye, my dresser, with the following results:—

A. *Upper Extremity*.—1. Forearm bent on arm by muscular action of the individual experimented on. In persons with considerable muscular development, pulse at the wrist entirely stopped.

2. Forearm bent on arm simply, with the hand flat on the shoulder. Pulse weak and indistinct, sometimes, but rarely, quite stopped.

3. Forearm bent on arm, with hand pronated. Pulse more weakened, sometimes stopped.

4. Forearm bent on arm, hand pronated and extended. Pulse usually quite stopped.

5. Forearm bent on arm, hand pronated, and bent at wrist. Pulse either almost imperceptible or quite stopped.

6. Forearm bent on arm, with a roll of lint or cambric pocket-handkerchief rolled up and laid in bend of elbow. Pulse always entirely stopped.

B. *Lower Extremity*.—1. Leg flexed on thigh. Pulse in posterior tibial artery much weakened.

2. Leg flexed on thigh, and thigh on abdomen. Pulse in posterior tibial stopped altogether almost invariably.

3. Leg flexed on thigh, with a roll of lint or cambric pocket-handkerchief laid in the bend of the knee. Pulse stopped in some cases, not always; but with flexion of thigh on abdomen also, pulse invariably stopped.

4. Thigh flexed on abdomen, the trunk bent forward. Pulse materially weakened.

From these experiments, as well as from those cases of actual bleeding in which this method has been used, it may be fairly inferred that we possess, in over-flexion, a blood-controlling agent of considerable power, which can be applied on the shortest notice, which requires neither instruments nor apparatus.

other than can be obtained in the poorest cottage; which can be put in force by anyone possessing neither special knowledge nor operative skill; which is not dangerous in itself; and which may be relied upon with certainty to restrain bleeding, at least temporarily, even when it may fail permanently to arrest it. The bleeding from a wounded artery is so striking a thing—so many circumstances concur to attract the eye and arrest the attention—the crimson blood flying in jets across the room, or welling from the wound; the deathlike aspect of the bleeding man—his livid pallor and convulsive agitation; these are so appalling; the absolute danger is so great and imminent, that we do not wonder if the ordinary bystander is palsied by affright, and the surgeon himself deeply impressed by the gravity of the situation. It is to such a scene that suddenly, and without preparation, he may be summoned, perhaps to some remote place, it may be in the middle of the night. Without assistants, except the terror-stricken spectators, who encumber the room, by the flickering light of a candle, a practised operator might hesitate to undertake the search after the wounded vessel. If, then, at such a time the mere flexion of a joint will remove the danger, allay the tumultuous excitement, dissipate the apprehension and anxiety, and relieve the surgeon from an embarrassing and perhaps doubtful operation, were it only temporarily, it is surely a valuable addition to our resources.

But when I find that in the upper extremity over-flexion may be relied upon as a permanently efficacious measure, enabling us, in wounds of the palmar arch for instance, to avoid a tedious and perhaps mischievous dissection in the palm, or the ligature of all the arteries of the fore-arm or of the brachial; when I recall to mind the controversies which have prevailed as to the best treatment of repeated and secondary hemorrhages; the choice offered to us between a tedious, difficult, and uncertain dissection in the midst of an ill-conditioned wound, or among a huge collection of clots, in search of the bleeding orifices, and a serious operation to ligature the trunk, in the lower extremity at least—an uncertain, not always effectual, and sometimes dangerous, proceeding; when I read in the most recent systematic works on surgery, that secondary hemorrhage from the deep arteries of the leg is a sufficient reason for amputation, and remember that I have myself seen a person narrowly escape amputation of the hand in consequence of wound of the palmar arch, I cannot but think I am justified in offering to your consideration this method as an illustration of conservatism in surgery. If you consider this account tedious and unnecessarily long, I must express my regret; but as this mode of staying the flow of blood from bleeding arteries is only just mentioned in the last edition of Mr. Erichsen's *Science and Art of Surgery*,

and not even alluded to in Mr. Holmes's, the most complete and popular systematic works on surgery of the day, it seems that some account of my own experience of the effect of position might not be altogether uninteresting.—*British Medical Journal*, Aug. 13, 1870, p. 165.

65.—ON THE TREATMENT OF INTRA-THORACIC ANEURISM
BY THE DISTAL LIGATURE.

By CHRISTOPHER HEATH, Esq., Assistant-Surgeon to
University College Hospital.

The patient, Julia W., upon whom I tied the right subclavian and common carotid arteries simultaneously in the Westminster Hospital on November 21st, 1865 (*vide* *Lancet*, Dec. 2nd, 1865, and Jan. 5th, 1867), died on December 8th, 1869, from the external bursting of an aortic aneurism. By the patient's own wish, I was able to have her body removed to the Royal College of Surgeons, where it was carefully injected from the abdominal aorta, and afterwards dissected by Mr. Moseley; and the preparation will be added to the college museum.

The condition of the patient at the time of the operation was as follows:—There was a pulsating tumour at the inner end of the right clavicle, which was thrust forward. The interclavicular notch, which was obscured by the tumour, could be felt on making deep pressure with the finger. The pulsation extended above the clavicle and slightly towards the sternomastoid muscle. When first seen there was no bruit, but subsequently a faint bruit could be heard. The patient was pale, but well nourished; she suffered considerable pain in the tumour at intervals, was unable to assume the horizontal position without distress and dyspnoea, and had some difficulty in swallowing. The right radial pulse was smaller than the left.

The patient was examined by numerous physicians and surgeons of eminence, and the almost unanimous opinion was that the aneurism affected the innominate artery, though there was some difference as to whether or not the aorta was slightly involved in addition. In the week during which the patient was in the hospital under observation the tumour decidedly increased, the pressure symptoms became aggravated, and pain with numbness in the right arm, came on. Under these circumstances, and believing the aneurism to be one of the innominate artery, I tied the right subclavian artery outside the scalenus, and the right common carotid artery above the omohyoid muscle, on November 21st, 1865.

In determining upon tying the two main arteries simultaneously in this case, I was influenced very considerably by

the arguments employed by Mr. Erichsen in his work on Surgery, wherein he shows that obliteration of *one* of the main trunks, whether by disease or ligature, has never been sufficient to effect the cure of aneurism—except, indeed, in Mr. Evans's case, where, however, the cure depended probably upon inflammation extending to the sac. Supposing each of the main trunks to receive one-third of the whole volume of blood passing through the innominate, the obliteration of one of them will still leave two-thirds of the amount passing through the aneurism. But in addition to this, there should, I think, be taken into consideration the fact that the stream must be sent with more force through the carotid and subclavian trunks, which are the continuations of the main vessel, than into the branches of the subclavian which come off at right angles, or nearly so, to the main current. Thus, I am not surprised to find that even when the subclavian and its branches have become obliterated, the carotid being pervious, the aneurism continued to make progress, as in a case of Dr. Herbert Davies, reported in the London Hospital Reports, vol. i., where the aneurism eventually burst into the trachea. By cutting off the two main streams, and limiting the flow of blood to the branches of the subclavian artery, it appeared probable that a cure might be effected, not by the entire obstruction of the innominate artery, but by the deposit of fibrin within it and the aneurismal sac, so as to arrest the disease. Mr. Wardrop believed that the carotid was already obliterated in the case on which he first tied the subclavian for innominate aneurism; and had it been so, the result might have been different; but, as the tumour diminished, the carotid, being relieved from pressure, began to beat again, and the aneurism to make progress. In an unpublished case which M. Paul Broca has kindly communicated to me, and in which he tied the subclavian for an innominate aneurism in August, 1862, the carotid was thought to be obliterated, but proved not to be so at the patient's death in the following February, the vessel being much displaced by the pressure of the tumour, and being reduced to about half its size. In this case, however, pulsation never returned in the vessel, which was obstructed, though not obliterated; and the case therefore resembles one of simultaneous ligature of the two main trunks. The death of the patient was caused by gangrene of the lung, and was in no way attributable to the aneurism, which was filled with fibrinous clot, leaving a cavity in the centre of the size of a small fowl's egg, communicating above with the carotid and subclavian, and below with the aorta. This last case may fairly be considered a cure as far as the aneurism is concerned (though M. Broca himself speaks of it as a "half-cure" *demi-guérison*), and it may be classed with Mr. Fearn's

well-known case in which he tied the common carotid in 1836, and the subclavian artery in 1838. Here the patient died nearly four months after the *second* operation, from an attack of pleurisy unconnected with the aneurism, and due to an accident; and, as may be seen in the preparation in the museum of the College of Surgeons, the aneurism—which is a sacculated one, involving the aorta in some degree, as well as the root of the innominate artery—is thoroughly filled with laminated fibrine, a canal being left for the passage of the blood into the unobliterated branches of the subclavian artery.

My patient made a perfect recovery from the operation. Pulsation returned in the right temporal artery on the night of the operation, and in the braehial two days after. There were never any head symptoms. The tumour did not alter in size immediately, but two days after the operation the patient was able to lie down with perfect comfort; and by the third day the tumour had decidedly altered, the pulsation could not be so distinctly felt, and there was a distinct double beat, but no bruit. By the sixth day after the operation the tumour had so much diminished that the outline of the inner end of the clavicle and upper margin of the sternum could be clearly defined, the pulsation being felt both above and below the bone. By the ninth day pulsation in the upper part of the tumour had nearly disappeared. On the eighteenth day both the ligatures came away without any hemorrhage. Attempts were made to favour the deposit of fibrine in the aneurism by the administration of the acetate of lead, by the application of ice to the tumour, and by careful regulation of the diet, but without any material advantage. The patient was discharged from hospital on March 6th, 1866, three months and a half after the operation, in good health, with no symptoms referable to the aneurism, which was now apparent only by a pulsation through a hole in the upper part of the right side of the sternum, and not in the sterno-clavicular joint as had been at first supposed. The right radial pulse was feebly perceptible, and the circulation on the right side of the neck fully restored.

The next thing I heard of Julia W. was that she had been admitted into St. Bartholomew's on Sunday, April 8th, dead drunk. I visited her on the 11th, and found that the tumour had diminished slightly since she left the Westminster Hospital; certainly it had not increased. The pulsation appeared the same as before.

I heard nothing further until I learnt from Mr. Hill, of the Royal Free Hospital, that Julia W. had been brought there by the police, intoxicated, on May 10th. I visited her and found a murmur at the apex of the heart, which was not present before, and fancied the tumour to be slightly more prominent.

Mr. Hill informed me that Julia W. had been a nurse in the hospital four years and a half before, when she suffered from an attack of rheumatic fever with heart affection, and that when she left the hospital a loud mitral murmur could be traced from the apex of the heart to the axillary region. She was in the Royal Free Hospital until August 8th, under Dr. Cockle, to whom I am indebted for the following notes of her condition:—

“The chief feature of interest in the progress of the case while in hospital was the variation in the size of the tumour; it sometimes being quite flat, with scarcely any perceptible impulse, at other times becoming round and prominent, with strong impulse which could be both seen and felt. Sometimes the impulse gave a liquid, at others a solid impression. When the tumour made any sudden alteration in size it was invariably preceded by a burning throbbing pain, increase of temperature, inability to lie on the back, and a sense of suffocation, with more or less vomiting, laryngeal voice, and pain in the shoulder, face, and side of the head of the right side. These remarks refer particularly to the periods of increase only of the tumour, the decrease being unattended with any symptoms of distress. She had rheumatic pains in the limbs from time to time, which were relieved by iodide of potassium. The cardiac murmur never entirely disappeared. The right ulnar pulse was for the first time discovered on July 5th. She left the Royal Free Hospital on August 8th, when the tumour was small and flat, and the impulse very slight. The treatment adopted consisted in absolute rest, the arm being kept in a sling. Opiates were given, and sedative local applications used to relieve pain.”

Julia W. was next heard of at St. George's Hospital, where she was taken by the park-keepers, who had found her insensible in the park. She was suffering from great difficulty of breathing when admitted, but soon recovered, and only stayed in the hospital two days.

I then quite lost sight of my patient until the 8th of November, when, being informed that she was in the custody of the police for being intoxicated, I procured her admission into the Westminster Hospital, and had the satisfaction of bringing her before the fellows of the Royal Medical and Chirurgical Society on the 11th of December, 1866. On her re-admission to the hospital, a year after the operation, I found that the tumour had decidedly diminished both in size and in distinctness of pulsation, though the hole in the sternum could still be felt, and it was here that the most prominent pulsation existed. The clavicle was not so much displaced as before. The woman appeared in very good health; her appetite was good, she could walk about without distress, and could lie down with perfect comfort. She said that she had occasional attacks of dyspnoea,

and that these came on when she had been drinking; and this accounts for her visits to other hospitals. There was no bruit to be heard in the tumour, nor any abnormal sound in the heart.

J. W. continued to lead a very irregular life, and was taken by the police to almost every hospital in London: but the disease underwent no material alteration until about two years after she was under my care, when the resident officer of one of the institutions to which she was taken when overcome by drink unfortunately administered powerful emetics to her, not being aware of her condition. After this the tumour, which could before be felt beating through the sternum, became much more prominent, and gradually increased in size until the skin became involved and discoloured. I procured her admission into the St. Elizabeth's Hospital some months before her death, and she received there every kindness and attention from the authorities and from Mr. Tegart, the visiting surgeon. She then complained of constant pain in the aneurism, which was relieved by the local application of morphia, and had occasional attacks of dyspnoea and prostration. A month before her death, there having been for some time a large ecchymosis over the tumour, an arterial bleeding occurred, but this was checked by styptics. Bleedings occurred from to time, and at last, on Dec. 8th, 1869, she died, after a copious hemorrhage.

On post-mortem examination the innominate artery was found to be healthy, except that it was somewhat enlarged at its origin. The arch of the aorta was extensively aneurismal. Immediately above the pulmonary artery the aorta was dilated, and presented a double pouch to the right side. Immediately above this, and extending up to, but not involving, the origin of the innominata, was the origin of the sac of the aneurism which had burst through the sternum; and externally, in front of the manubrium, was the thin-walled sac full of soft coagulum, which had given way toward the left side above. On opening the aneurismal tumour within the thorax, it was found to be a distinctly sacculated aneurism, springing from the right side of the ascending portion of the arch of the aorta, higher than appeared externally, owing to the lower part of the aneurism having grown downwards and to the right. This portion of the sac contained firm, laminated fibrine, to the thickness of one-third of an inch. The portion of the aneurism attached to the sternum contained no fibrine, except the loose clot in the outer sac. The subclavian artery was reduced to a fibrous cord, one inch in length, immediately outside the scalenus, and the right common carotid was obliterated in the whole of its course, the point of ligature being marked by a delicate fibrous cord, and the upper inch and lower two inches of the vessel

forming a flat fibrous band, nearly-one-fourth of an inch wide. The collateral circulation in the arm and neck had been fully established. The preparation was brought before the Pathological Society of London on April 19th, and a more detailed description, with a drawing, will appear in the next volume of the Society's Transactions.

The preceding case appears to raise a very important question in practical medicine and surgery—whether in cases of aneurism of the arch of the aorta, it is not possible to afford relief by surgical interference. There can be no question that my patient's urgent symptoms of dyspnoea and dysphagia were relieved by the double ligature, and that her life was prolonged very considerably under the most untoward circumstances. Dr. Cockle has already (the *Lancet*, April 10th, 1869) urged ligature of the carotid in cases of aortic aneurism which are making progress in spite of medical treatment; and when the disease involves the transverse portion of the arch, I should be inclined to follow the suggestion as regards the *left* carotid. But when the disease involves the ascending portion of the arch, I believe the only hope of success will be in tying both the right carotid and subclavian, so as to diminish as far as possible the current through the innominate, agreeing as I do with Dr. Sibson in the importance of attacking the vessel next to the aneurism.

In reference to the cases of distal ligature, quoted by Dr. Cockle in his valuable paper already referred to, I may remark that both the cases of Tillanus and Rigen, in which cure of an aortic aneurism followed ligature of the carotid, were examples of ligature of the *left* carotid, the aneurism being on the transverse portion of the arch. In Montgomery's case the ligature was also on the *left* side, and the aneurism was found four months after the operation to involve the aorta between the innominate and left carotid arteries, thus supporting the view I have put forward above. In Mr. Maunder's case, in which he in 1867 followed my example of tying the two arteries on the right side for supposed innominate aneurism, the disease proved to be principally aortic, and the coagulation had extended down to the heart, and thus occasioned death. In my own case, the aneurism being more distinctly sacculated, this untoward result did not occur, nor is it to be necessarily anticipated in another case.

Before quitting the subject it may be well to note that in two cases, at least, distal pressure has given relief in aneurisms of the root of the neck probably involving the aorta. In the *Edinburgh Journal* for October, 1847, p. 229, there is a report of a case, by Dr. Lyon, in which the patient had a large aneurism of the size of the fist, reaching upwards from the sternum,

on the right side. Pressure on the carotid was made at intervals, and the tumour became more solid. The patient was of intemperate habits, and died of bursting of the sac into the pleura after twenty months. The aneurism was found to involve the innominate and aorta. There was a large fibrinous deposit opposite the attachment to the right sterno-clavicular joint, and the other parts of the sac were filled with soft coagulum. In the *Lancet* of Jan. 9th, 1858, the late Mr. A. M. Edwards, of Edinburgh, has recorded a case of supposed innominate aneurism in a woman of fifty, in whom Dr. Laycock pronounced the aorta also to be implicated, and in whom great relief of all distressing symptoms was procured by the adaptation of pressure to the right common carotid and subclavian arteries. Unfortunately the termination of the case and post-mortem appearance have not, so far as I know, been published.—*Lancet*, July 2, 1870, p. 11.

ALIMENTARY CANAL.

66.—A NEW TONSIL GUILLOTINE.

By Dr. JOHN EWENS, Cerne Abbas, Dorset.

[The following appears to us a decided addition to the instrument of Mathieu for removing the tonsils. There is in children such a natural inclination to close the mouth, when the tonsils are pressed against, that it is often with the greatest difficulty that the operation can be concluded successfully.]

It seemed to me that a gag might be so adjusted to the instrument of Mathieu as to prevent this closure, at the same time acting as a tongue depressor. Mr. Hawksley, of Blenheim-street, Bond-street, London, has met my difficulty, and has constructed for me an instrument which answers the purpose fully. After being adjusted over the tonsil, by a single continuous movement of the thumb transfixion and amputation are instantaneously accomplished, without a chance of failure, and with the utmost facility, the mouth being kept wide open by the gag for the adjustment of the instrument over the tonsil and during its removal. I have thus removed the tonsils of three children very recently, with the utmost comfort to myself and security to the patient; and, as the majority of cases come under the notice of medical men whilst the patients are children (and generally intractable), I consider the improvement in the instrument will prove a great boon to any who have to perform this, if not formidable or generally dangerous, at least troublesome, operation.—*Lancet*, May 21, 1870, p. 730.

67.—NEW INSTRUMENT FOR THE OPERATION IN FISTULA IN ANO.

In a recent case of operation for fistula in ano, instead of the usual plan of introducing the bistoury through the fistula, and bringing it down through the sphincter, Mr. Weeden Cooke used a scissors constructed for him by Messrs. Weiss. The finger having been introduced into the rectum as a guide, Mr. Cooke passed one blade of the scissors into the fistula up to its extreme point, and then the other blade into the rectum. The two blades were then connected by a small screw, and by one rapid scissors action the sphincter was divided.

As the position required for this operation renders it unadvisable to give chloroform, and as the patient, unless very carefully held by assistants, often shrinks so as greatly to embarrass the surgeon, any plan which ensures rapidity is advantageous, and it is with this view that the mode of operation described has been suggested. It was thought that it caused less pain than the bistoury.—*Lancet*, June 4, 1870, p. 803.

URINARY ORGANS.

68.—ANALYSIS OF 184 CASES OF STONE IN THE BLADDER OF THE ADULT TREATED BY LITHOTRITY.

By Sir HENRY THOMPSON, Bart.

[The following is an abstract of Sir Henry Thompson's paper. It was read before the Royal Medical and Chirurgical Society.]

The author presented a series of 184 consecutive cases of lithotritry in the adult, operated upon within a recent period; all treated by the same method and with the same instruments. He furnished all the most important details relating to each case, and presented the stone itself in almost every instance, preserved for inspection. His object was to make an impartial estimate of the crushing operation, to ascertain its real value, and its place among surgical operations. Although this had never yet been fully done, he regarded Sir B. Brodie's last communication to the Medical and Chirurgical Society as perhaps the most trustworthy and valuable record, so far as it goes, which exists on the subject. In order to accomplish this object, he had made carefully written records of every case; and he cited the following circumstances as necessary to be taken into consideration: that the 184 cases had been treated by a uniform method, within a comparatively brief period of time; that all were adults, and embraced much variety of constitution; that

all the important facts relative to each were noted in a history of each one, which was attached to the paper as an appendix; and that a large proportion of the calculi were of considerable size. And the author believed he was correct in saying that so complete an opportunity for studying the results of lithotrity had not been offered hitherto, since, as far as he was aware, the data necessary for the formation of a judgment had not been presented to the profession, either in this country or elsewhere.

The results of the operation were discussed under the following heads:—1st. The rate per cent. of recovery after the operation, and the causes of death when it occurred. 2nd. The general condition of the patient after the operation. 3rd. The frequency of recurrence of stone after lithotrity.

The chief facts relative to the 184 cases were as follows. They were consecutive in point of time, no case being omitted; that all were adults, and mostly of advanced age; that they included many individuals of very feeble health and constitution; that they were chiefly British, although several were from other nations. The mean age of the 184 cases was no less than sixty-one years. The youngest was twenty-two years old. Only three were below thirty years. The oldest was eighty-four years. There were forty-six cases of seventy years and upward. With very few exceptions, all stones of an ounce and upward were reserved for lithotomy. All obviously below that were crushed. Not one case was refused operation, not one was left unfinished, and in no instance was an operation of lithotrity completed by lithotomy. The recoveries, reckoning every kind of casualty following the operation, were 93 per cent.; but omitting five cases of death, not by any means due to it, the mortality amounted to only 4 per cent. A second operation for recurrence of the stone was performed for thirteen of the 184 cases; 122 were uric acid and the urates; 16 were mixed; 40 were phosphatic; 4 oxalate of lime; 1 cystic oxide; and 1 pure phosphate of lime.

The important logical conclusion to be derived from the mass of facts considered was, that lithotrity is an eminently successful operation. For a certain number of cases, its success may be regarded as a certainty—absolutely without fear of any contingency, except such as attends the minor operations of surgery,—for example, the opening of a small abscess, or the passing of a catheter. For the author stated that he had never lost a patient in the whole course of his experience after crushing a stone which was no larger than a small nut; and this he considered was a size at which, with few exceptions every stone ought to be discovered. But this very fact led the author to remark that the success of lithotrity cannot therefore be con-

sidered apart from a knowledge of the extent, in regard of the magnitude of the stone and the constitution of the patient, to which the capabilities of the operation have been pushed. When it is employed for stones as large as a date, or a small chesnut—and it is impossible to deny the excellent chance of success which this method offers to the subjects of such stones—a certain, but still only small, proportion of deaths must be expected. And the rate of mortality will correspond with augmentation in the size of the stone, and with the amount of existing disease and age on the part of the patient. Given a small stone in a fairly healthy person, and success is certain; the possibility of contingency in such a case depending only on the presence of those remote and excessively rare conditions which will make for an individual here and there the mere passing of a catheter a cause of death.

The rule observed had been, for the most part, to apply lithotripsy to all calculi obviously less than an ounce in weight, easily discovered by sounding, and to operate on all larger ones by lithotomy.—*Lancet*, June 4, 1870, p. 805.

69.—A CASE OF SEVERE STRICTURE OF THE URETHRA.

By T. VINCENT JACKSON, Esq., Senior Surgeon to the South Staffordshire General Hospital, Wolverhampton.

The following case has lately been under my care,—and illustrates so well the advantages of certain plans of treatment, that I have no hesitation in placing them on record. The relief of severe and complicated cases of urethral stricture is one of great surgical interest, and I am sure that all practical Surgeons who are much employed in the management of these affections will readily admit that no one plan of treatment will answer for all cases; that, in fact, we must have more than one string to our bow. In ordinary examples of stricture simple dilatation is quite sufficient to effect all that is necessary, and in no way can this be so easily, effectively, and, as it were, painlessly obtained as by the use of some soft instrument—bougie or catheter—and in this manner a large number of the cases which present themselves either in the out-patient room or in private practice can be dealt with. For the more severe and complicated classes less simple measures are required, but mostly for their employment (excluding all cutting operations) it is a *sine qua non* that there should be such a continuity and sufficient patency of the urethra that an instrument can be carried into the bladder, and this, if the Surgeon wills it, can be tied in and retained at his discretion, then withdrawn and a larger one substituted, and the process repeated until the

calibre, or near about, of the healthy urethra is reached. This plan has its advantages and its disadvantages. The advantages are the rapidity, ease, and the minimum amount of pain which it entails on the patient ordinarily; the disadvantages, that it necessitates keeping the sufferer in bed; and my experience leads me to the conclusion that a contraction of the stricture more quickly takes place after continuous dilatation than after other plans of treatment.

A modification of the above is very frequently employed, in fact we are compelled by our own fears to adopt it as far as the first step; for a Surgeon perhaps has spent an hour or more in getting through a stricture, succeeding at last, if the ease is one of retention also, in emptying the bladder through the smallest metallic or non-metallic catheter. Who likes to withdraw it? The patient is well aware of this, and says "You won't take it out?" and so it is tied in and retained for such a time as will allow, upon its withdrawal, a dilator of some sort to be introduced, and "splitting" or "distension" terminates the proceedings. Splitting an urethral stricture is an operation of recent times, and its proposer, Mr. Holt, has in no way spoken too highly of it; up to the present time I have used his dilator one hundred times. I have not picked my cases, and the very worst that have come before me have tested approvingly this method. The summary of my experience of it is the following:—The operation is one that can easily be borne without chloroform, but it is far from being anything like painless; the moment No. 10 or 12 tube enters the meatus, as it is pushed along the hollow conducting rod, flinching and a general involuntary muscular resistance commences, reaching its maximum when the stricture is split, and frequently also at this moment extorting a lamentation. The pain certainly does not subside until the dilator is withdrawn, and as a rule it lasts for some time after. Hemorrhage to some extent, frequently hardly noticeable, always takes place. The bladder should be evacuated after the withdrawal of the splitting instrument by the introduction of No. 11 or 12 silver catheter, but there is not the slightest clinical necessity to tie it in. Sequential to the operation, rest either in bed or on a couch is necessary, and I never omit ordering a draught of opium and quinine to be taken immediately, and I am convinced it has warded off many a shiver. In the course of two or three days a full-sized metal instrument should be passed into the bladder, and the introduction repeated twice a week for a fortnight. Finally, the patient is instructed how to pass an instrument for himself, the perpetuation of the cure being thus left in his own hands.

A favourite form of instrument with me is one which, a few years since, I devised, and had a set of them made for the

treatment of stricture by simple dilatation. Originally they were solid throughout, but lately I have had them constructed partly solid and partly hollow, combining all the advantages of the catheter and sound, permitting an evacuation of the bladder on each occasion of their employment; and I regard this as of some moment, especially after the operation of splitting, for necessarily the passage of an instrument, however well managed, must produce an irritation of the split portion, and I take it this will be intensified in the case of a catheter, the eyelets on its side catching mayhap a portion of the painful tissue, which by dipping in, becomes grazed, and more suffering than is desired consequently inflicted; therefore to reduce this to a minimum and obviate any reirritation by the urine afterwards, I always empty the bladder at the time of the instrumental introduction, and, for the reason named, I decline to use a catheter, but employ the "catheter conical sound" instead.

In considering the question of the applicability of conical sounds for the treatment of stricture of the urethra, it appeared to me that a slight alteration in their construction would be an advantage in many cases. What I mean is, that the form of the instrument instead of resembling simply an elongated cone, should be made so as to consist of two cones, their bases being conjoined, and the following plan is the one I have adopted in their formation. The first cone commences at the extreme point of the instrument, and extends for a distance of 3 inches, its base here meeting with the base of the second cone, and this latter gradually and almost imperceptibly diminishing in size reaches the handle, a distance of 6 inches. From such a construction it is evident that the maximum cylindrical thickness is obtained at a certain known distance from the point, for up to this point the calibre of the instrument gradually increases, and from this point it gradually decreases; for instance, let us say that the point of the sound is equal to 8, 3 inches from the point it is equal to 12, and at the handle, a distance of about 6 inches, it equals 9; the first cone, therefore, is shorter and of a less circumference (except at the base) than the second.

Hitherto these sounds, their precise form and curve varying according to the whim of individual surgeons, have been manufactured solid, but a few years since I altered my instrument in such a way that it became partly solid and partly hollow, solid for a short way from the point, and for the remaining distance channelled.

Rarely but still occasionally cases of neglected urethral stricture turn up, which are instrumentally impassable, the urine escaping by fistulous perineal tracts, a drop or two now and then leaking through the meatus urinarius.

External urethrotomy is the operation usually resorted to to

restore the urethral conduit, but in one of the cases I record I adopted a milder treatment; the feebleness of the patient forbidding, I considered, a cutting operation. I relied, therefore, upon the potassa fusa to destroy the callous tissue, and fortunately not in vain. At the present time the employment of chemical caustics in the treatment of stricture is not very fashionable. Nitrate of silver, proposed by John Hunter and almost universally employed by Sir E. Home for the treatment of every variety of stricture, is now better confined to those limited numbers of sensitive strictures, which, bleeding at every touch, are rendered immediately amenable to dilatation by cauterising their face two or three times with a waxed bougie armed with a bit of lunar caustic. A few surgeons systematically follow the practice of the late Mr. Whateley, of destroying the thickened tissue by the application of potassa fusa at regular intervals, and notably amongst these surgeons stands Mr. Wade, whose experience has taught him that Mr. Whateley's fears upon one point are groundless, and that strictures which are instrumentally impassable are with proper precautions as safely and successfully to be treated by caustic potash as those which are instrumentally passable. "I commonly," say Mr. Wade, "adopt potassa fusa in impassable stricture from a conviction that it is, at all events, the safest, if not as I certainly believe it to be the most effectual, for the relief of the patient in the majority of such cases."—*Medical Times and Gazette*, June 4, 1870, p. 604.

AFFECTIONS OF THE EYE,

70.—ON CATARACT.

By HAYNES WALTON, Esq., Surgeon to St. Mary's Hospital.

The removal of cataract: General considerations.—There are many points here that demand careful consideration.

It is a cardinal point in ophthalmic surgery not to operate on an eye for the removal of cataract, so long as it may be rendered available for ordinary purposes, by optical appliances, or otherwise, except at the request of a patient, and after he is made aware of all the circumstances of the case.

An operation ought never to be undertaken in anticipation of blindness, because the cataract may not increase, and the hard variety is often very slow in maturity. Years may pass away with but little progress. The several conditions of lenticular cataract require different operations, and the choice of any one should rest solely on the circumstances of the disease.

The hard cataract should, as a rule, be extracted, that is,

removed from the eye, or displaced, by being pressed into the vitreous humour. So long, therefore, as the opaque lens is yet hard, and not reduced in density, by the secondary changes of atrophy, it would be imprudent to attempt to make it disappear by absorption, because such action would be very slow, and during the tedious process, the eye is particularly liable to inflame, and so be thereby damaged. Besides any particles of the cataract which might fall into the anterior chamber, or the posterior, would most likely set up an attack of inflammation and endanger the eye. The failing nutrition of the eye of an old person renders it most unfitted to bear irritation from such a source, for while it causes high susceptibility, it destroys power of resistance.

Some years ago I tried with the utmost care, to effect absorption in patients beyond the age to which this method is generally restricted by most surgeons, and although I did get some good effects, the general result fell far below that from extraction. Now I always extract when there is any visible amber change in the cataract, and also when the lens has a whitish surface, the result of the secondary change, if the age of the patient renders it likely that there is an amber-coloured nucleus, and hard.

Soft cataract should, as a rule, be allowed to remain in place, and be lacerated, or so broken, as to admit of the process of absorption, or solution, to which its softer texture readily yields; for with this simple operation, the natural powers are quite capable of causing its complete dissipation.

Capsular cataract must be removed from the eye, or be cut, or torn through, to enable it to contract.

Preparation of a patient.—Operations implicating the globe of the eye demand for their success, so far as the body of the individual is concerned, that state of health in which a wound can be inflicted on a delicate and sensitive organ, with the greatest impunity. In the operation for extraction, unless union of the cornea be quickly effected by adhesion, success must always be more or less imperfect, and destruction of the organ will frequently ensue.

Although we have no means by which to test this bodily state, because there may be power enough where its pressure is doubted, and it may be lacking in those who are apparently in good health, yet certain bodily conditions can be pronounced, as being in the main unfavourable. Those persons who have long undergone want of sufficient food give the worst results. My success with hospital patients never equals that in private life.

A debilitated constitution requires to be improved to the highest standard that the idiosyncrasy of the person will allow.

Plethora should always be avoided. An accustomed eye soon detects the habit of body that is popularly called "rude health," and a person exhibiting it in a marked degree should be reduced by regulation of diet, exercise, and gentle purgation if necessary, till any excess disappears, and the circulation is rendered more natural.

So long as we are unable to say where health ends, and disease begins, and to make a distinction between the failing of the living machine from decay and actual disease, a patient should be left alone, except he exhibit some decided abnormal constitutional symptoms, respecting which we can be tolerably sure about the beneficial effect of treatment. I do nothing for the great majority of my patients.

Dr. Jacob, in his *brochure* on the operation for cataract with the fine needle, makes excellent remarks, which are not less practical than original. He says the value of preparatory and after-treatment, as part of the surgeon's care in cataract operations, has been fully appreciated, and, in practice, amply made available; but the value of a respectful consideration of all the functions of the animal economy upon which health depends has not been so well understood. It is assumed, he continues, that a patient should be prepared for an operation by taking physic and abstaining from food; yet a rational man, acquainted with the consecutive operation of each apparatus provided for the growth, repair, and preservation of the living being, may well doubt the correctness of such a view. The universal faith reposed in the practice of giving and taking physic has led practitioners not only to place too much reliance on that resource, but to resort to it sometimes to the injury of the patient. In preparing a patient for an operation, he does not act on the belief that empty bowels are essential to health, or that what are called *feces* should not be found in the intestinal canal; on the contrary, he proceeds on a conviction totally different. If a patient be in good health, notwithstanding an habitual retention of the contents of the bowels beyond the prescribed periods, he does not risk an interruption of health by disturbing the natural functions of the stomach and bowels, and therefore refrains from giving physic. But if not in good health, he endeavours to bring him into that condition by every means, and resolutely resists every attempt to induce him to operate until he has accomplished that object. Above all things he thinks that the state of the digestive organs should be carefully studied, and when found defective, if possible repaired. He believes that nothing seems to require more attention than the condition of the tongue as indicative of the state of the stomach and bowels. If it be coated with discoloured adhesive mucus, the functions of assimilation and nutrition are probably imper-

fectly performed, and a resulting tendency to destructive inflammation from local injury is engendered. He writes in conclusion, it is usual in preparing for this and other operations to make great alterations in diet, substituting liquid for solid, and vegetable for animal aliments. This, however, must be done with caution, leading as it inevitably does to disturbance of the digestive function and interruption of the assimilating and nutritive processes, if suddenly or exclusively adopted. Without digestible nutritious food, good chyle and blood cannot be produced, and without good blood, local injuries are liable to suffer from destructive inflammation. I endorse all this.

The whitish and rather coated tongue of the aged should not be mistaken for a symptom of unhealthiness. In them this organ is not so ready an index of the state of health as in early years; attention should therefore be paid to the urine, the deposition of uric acid, or of the urate of ammonia, being a sure indication of dyspepsia, or excess of nitrogenised food, or of fever; and that of phosphate of lime or the triple phosphate, of the opposite states of prostration and nervous depression. Yet an operation should not be undertaken with a decidedly loaded tongue. The abdominal evacuation should, with the least apparent necessity, be examined for evidence of the hepatic state, and for information respecting the digestion of food, particularly in those past the meridian of life, because it is then that these functions are mostly at fault, and all kinds of operations less successful. In the majority of persons far advanced in years, who have passed through operations under my hands, it has been necessary to increase, or, if I may so call it, force the circulation, by tonics and stimulants. Towards the limit of the natural term of life, we should not without ample necessity, cut off the accustomed amount of daily nourishment or the usual stimuli.

My immediate preparation of a patient is never more than the administration of some mild laxative the day before operating, solely that the necessary quiet after the operation may not be disturbed for a day or two by the natural action of the bowels, and any likelihood of straining at stool may be avoided.

Some general conditions contraindicate operating.—The presence of active specific inflammation, as the strumous, gouty, syphilitic, or rheumatic, in any part of the body, would contraindicate an operation. So also may be said of the time of pregnancy. Some surgeons avoid the period of menstruation.

Organic disease in the chest is not necessarily an impediment to operating. I saw extraction done on the eye of a female, 57 years old, who had valvular disease of the heart, ascites, and anasarca. The operation was quite successful, and the patient returned home on the eleventh day after its performance. Her

heart had been diseased for five years. I have operated several times respectively when the heart has been diseased, and in the early stage of phthisis.

Kidney disease renders a person most unfavourable for an operation.

Atheromatous arteries interfere with primary union of the cornea in extraction.

While unquestionably the result of an operation of any kind will much turn on the state of the patient's health, that for solution may be undertaken and success secured, when that for extraction is scarcely admissible, and unfortunately the latter is most required when the complications are most likely to exist, namely, in old age. Chronic bronchitis, and asthma, interfere, I believe, more from their general effect than any mechanical disturbance to the eye from the cough, although if this be violent, it will prevent the healing in the right way.

As we cannot select our patients or reject according to the absence of complications, or the presence of them, we should never operate under disadvantageous circumstances, without making the drawbacks known to the patient or his friends.

Advanced age is not in itself an objection to operating if nothing else forbid. The best attainable results have followed extraction after 90, in the hands of Sir W. Lawrence. The late Mr. Scott did the same operation on a female between 90 and 100. I have several times performed it to my complete satisfaction, after the eightieth year, and once as late as the eightysixth. Two cases of success are recorded after the patients have turned 100 years each. Of course after the seventieth year a person is less favourable for the ordeal of extraction, from a variety of circumstances and from contingencies inseparable from long life.

When only one eye is blind from cataract, whether an operation should be done, is a question about which it is likely there will be a difference of opinion. The subject admits of discussion.

The removal of the cataract is not demanded on the score of the retina losing its function, because it is veiled. The retina does not become diseased from cataract. This has been proved over and over.

A person with one eye, although not half-blind, labours under very great disadvantages, the greatest of which is the narrowing of the field of vision laterally; he is blind on one side.

Theoretically, there is no drawback or disadvantage to the removal of the cataract.

The age of an individual assists much in determining the course to be pursued.

In early life the appearance of cataract in one eye may materially affect a person's prospects. It is at this time, too, that a

cataract is more visible from its nature, being soft. Now, also the operation which is applicable, that for solution, is almost almost sure to succeed.

Late in life the prospects of an individual, social and otherwise, are quite altered, and personal appearance is not then of so much value, and the suitable operation, that of extraction, is not so certain. On many points, therefore, an operation is more admissible in a young person. The advantages, notwithstanding the imperfect image on the retina of the lensless eye, from the circles of dispersion, are enlargement of the visual field, and as the eyes act together in binocular vision, increase in the intensity of optical impressions and better applications of the dimensions of bodies, and improvement in the judging of short distances.

Practically there is not any disadvantage in operating. In every instance in which I have removed the cataract, both in young persons and in those of middle life, I have received the distinct assurance from each, that much advantage was obtained, and all were pleased at having undergone the treatment.

Several times I have endeavoured to unite the foci of the eyes, for distant vision, and for near, so as to give a common distinct perception, by means of convex glasses, but I have been unable to effect it satisfactorily on account of the inequality of the images, and the loss of accommodation in the one eye.

The rule therefore which I follow is, in early life, to advise an operation, and late in life to state the particulars to my patient, and ask him to decide.

When one eye is blind, and the other so far affected also with cataract as materially to impair sight, there can be no question in the abstract about the propriety of operating on that which is fully cataractous. There is no reason why a person should be allowed to become quite blind in both eyes before sight is restored. Much inconvenience is prevented by operating on the one eye before the other is obscured.

When both eyes are equally affected with blindness, only one at a time should be operated on for extraction, and the first should be allowed to recover before the other is touched. There is thereby less shock to the system. Besides, if in a first operation there appears some constitutional peculiarity of bad tendency, it may be removed, or in some measure reduced, before the second is undertaken.

When the double operation is done, inflammatory effects on the system from one eye going wrong might be the means of spoiling the healing process in the other.

Both eyes may be operated on at the same time for solution.

The operation for extraction should be done at a certain stage of the cataract.—It may be performed too early and too late.

When the lens is not entirely pervaded by atrophy, the circumference has not undergone that change which will enable it to quit the capsule readily, and an easy escape is an important element in the success of the operation. Besides, while there remains any surface lens tissue unaltered, much of it, or all of it, is tolerably sure to be left in the capsule, and some may remain in the chambers of the eye; in either case irritation is produced, and there may be some inflammation. Therefore, a cataract should be matured before an attempt is made to extract it.

Some surgeons have adopted the process of what they call anticipating the cataract by pricking it with a needle, so as to render it fully opaque. This is to be condemned; injurious inflammation is risked, and the eye is always rendered less fitted for the extraction, as it always inflames a little in old people. Healthy lens tissue resists a wound more than that which has atrophied. Again, if this be done with the view of getting the cataract to quit the capsule easier, it is useless, for there is not that softening at the surface which is so characteristic of the natural atrophy.

Cataracts that have undergone the secondary change or late atrophy, in which calcareous deposits have formed on the surface and on the inside of the capsule, thickening it, are less favourable for treatment, because not only does the capsule not retract as is desirable when it is scratched with the curette, and allow of the easy escape of the cataract, but the cutaneous deposits are more or less retained, and accordingly obscure the pupil.

The operation for solution should not be undertaken until the cataract is thoroughly mature, because any healthy lens tissue that is rendered opaque by the operation, and exposed to the aqueous humour, invariably swells very much more than that which is cataractous, and thrusts the capsule against the iris, producing adhesions between the two, and may besides cause injurious effects to the eye from pressure. At the same time it should not be delayed till secondary degeneration is far advanced, and because then the capsule is likely to be much affected, and therefore trouble may arise from thickened capsule being in the pupil.

A surgeon should be cautious, even under the most favourable circumstances, never to overrate the chances of success of any operation for cataract, nor to allow it to be thought that any is infallible. Above all, when there is the slightest indication which would render the result questionable, or imperfect, owing to individual peculiarity or constitutional taint, here-

ditary or acquired, it is right, as regards the patient, and a safe provision for himself, that all the particulars for and against operating should be stated clearly and intelligibly without the least dissimulation.

The season of the year most fitted for operating has occupied attention. With reference to needle operations, I suspect it matters not; nor, perhaps, is any operation in our climate influenced by the mere degree of temperature, which is rarely in either extreme. In extracting in cold weather, the room to which the patient is confined I have kept at a uniform temperature—not lower than 60° Fahrenheit for the first few days. Many very excellent surgeons never extract in winter, and Mr. Tyrrell thought the best time for that operation to be between March and October. Where a choice is permitted, I should, as a rule prefer that period, because regular exercise prior to the operation is less likely to be interfered with, from the greater certainty of settled weather, while the apartment can be better ventilated, and the patient will be able sooner to take out-door exercise, and recover his lost strength and spirits, the consequence of anxiety and confinement. At this time, therefore, convalescence is less likely to be protracted. Again, when the state of the eye is such as to render the success of the operation somewhat doubtful, I should prefer summer weather.

Operation for extraction, by a crescentic corneal cut.—This is the operation which is the most suited for the removal of a hard cataract. By it alone can the best results be obtained, and, as I believe, the highest average of recovery. It is preferable to all methods of extraction, whether in the hands of the inexperienced or in those of experts.

Extraction is frequently referred to as one of the most difficult operations in ophthalmic surgery. While I fully admit that for accurate execution great nicety and practice are needed, I do not hesitate to say that its difficulties are greatly exaggerated.

Every step of the operation requires to be well done, or failure ensues. All must be exact.

The pupil should be always dilated, because more room is then given for the laceration of the capsule.—Some of the dilatation is lost when the aqueous humour escapes, but some remains. The dilatation may have some effect in keeping the iris out of the way of the knife. It, too, will always discover the existence of any adhesion between the iris and the capsule of the opaque lens, and disclose that state of the iris, apart from adhesion and inflammatory disease, whereby it will not expand much, and which is an obstacle to the escape of the cataract.

A patient should always lie down, at full length on his back, with his head alone a little raised. He can be steady only in

this position. It matters not whether the operator sits or stands, so long as he has sufficient command over his work.

The importance of a properly regulated light is evident. An operator will, of course, choose that which, according to the arrangement of the room, suits best. In private practice, he should ascertain this by trial with his assistant, before the patient is brought in. A few general directions may be useful. The patient should be placed near a window obliquely, so that the eye will be lightened, while the light is not reflected from the centre of the cornea, so as to prevent the operator from seeing clearly what is necessary to be done. A position exactly opposite the window will produce the reflection which obscures. It is better to have only one window open, and the lower part of that should be closed by shutters, or screened by a blind, as it is advantageous to have the light from above. Sunshine must be avoided.

All the principal articles of clothing should be taken off, the patient prepared to go to bed, and a morning gown put on, to prevent the inconvenience of undressing afterwards.

I divide the cornea in the upper part, preferring that section as it possesses many advantages over the lower, such as the greater certainty in making it effectually, the less likelihood of the flap being interfered with by the eyelid, and the upper position of the pupil, should the iris prolapse. Besides, if the prolapse occurs in the form of a marked tumour, it will be less irritated here. Any cicatrix is also better hidden.

It is better to stand behind the patient in every instance, as it gives much greater command over the globe of the eye. But when the left eye is to be treated, if want of practice or deficiency of confidence disqualify the left hand, the operator must stand in front, and submit to the great disadvantage of resigning to another, his assistant, what he ought to do himself, as most important acts, the retracting of the upper eyelid, and the steadying of the eyeball, while he uses the knife in the direction he prefers, upwards or downwards.

I always grease my knife slightly with olive oil, because it prevents the corneal flap from sticking to it, no slight advantage.—*Medical Times and Gazette, July 23, and Sept. 24, 1870, pp. 88, 358.*

71.—ON EXTRACTION OF CATARACT BY VON GRAEFE'S PERIPHERAL LINEAR SECTION.

By HENRY WILSON, Esq., Assistant-Surgeon to St Mark's Ophthalmic Hospital.

Von Graefe endeavours to avoid the principal dangers of flap extraction, by making the section as small as possible compatible

with the exit of the lens, in such a structure as is least liable to suppurative inflammation, and in such a position and manner as will allow of the most facile delivery of the lens and of the most perfect coaption of the surfaces of the wound, as well as by adopting such precautionary measures as are likely to guard against subsequent destructive inflammation. These objects he attains, I conceive, by executing a small nearly straight section in the sclerotic border, and corneosclerotic junction, nearly opposite the margin of the lens, by making a conjunctival flap which shall cover the wound, and by performing an iridectomy.

It is well known that wounds in the sclerotic and corneosclerotic junction are less liable to suppurative inflammation, and that they heal more readily than those in the transparent cornea; the external wound measures $4\frac{1}{2}''$ — $5''$ and the internal one $4\frac{1}{2}''$, the height of the flap does not exceed $\frac{1}{4}''$ whereas it measured $2''$ — $2\frac{1}{2}''$ in the old flap extraction. The wound in von Graefe's operation, though strictly not a linear one, may for all practical purposes be regarded as such; its surfaces lie in exact apposition, it is covered over by the conjunctiva, and is in every respect in the most favourable position for immediate union. By a reference to the illustration it will be seen that the opening is as nearly opposite the margin of the lens as is possible without interfering with the ciliary body and processes. The manifest advantage of this position as regards the delivery of the lens, is that when the iris is removed, the capsule opened and pressure made at the opposite side of the globe, the lens glides easily and naturally into and through the wound; the disadvantage is that the internal corneal margin being cut across the zonula is thereby deprived of its support, and there arises a tendency towards escape of vitreous, a circumstance which has occurred in about twenty-five per cent. of the cases I have operated on.

The operation is performed as follows:—The patient is placed in the recumbent position, on a couch or bed opposite a good light, the eye not to be operated on is covered or bandaged down, the eyelids separated by the spring speculum, and the globe drawn downwards by a toothed forceps applied immediately below the inferior margin of the cornea; in fixing the eyeball a broad fold including the sub-conjunctival cellular tissue and even the insertion of the inferior rectus if feasible should be grasped between the blades of the forceps, for the conjunctiva alone affords often but a slight hold and is liable to be torn through. In fixing the globe it should be rotated directly downwards, otherwise the section and consequently the iridectomy will fall towards one side and the resulting coloboma will be exposed to view and appear unsightly as well as give rise possibly to disturbing dazzling. When the operator has thus

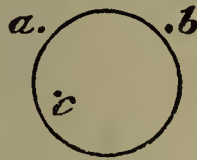
steadied the eyeball he holds the knife here figured in his other hand, its flat surface parallel to the plane of the iris, its cutting

Fig. 1.



edge directed upwards and inwards, and inserts its point into the sclerotic $\frac{1}{4}$ " from the corneal margin at *b*, Fig. 2, copied from

Fig. 2.



v. Graefe, which represents the left eye, and pushes the instrument obliquely downwards and inwards into the periphery of the anterior chamber towards *c*, in order to secure a large internal wound. When the knife has entered the chamber in this direction, to the extent of 3" or $3\frac{1}{4}$ " its handle is depressed and the point thus elevated is directed towards the counter puncture *a*, and pushed onwards beneath the opaque cornea into and through the sclerotic border. When the point of the knife has penetrated the sclerotic and appears either underneath or outside the conjunctiva, the cutting edge of the instrument should be turned very slightly forwards, and the section completed in the corneo-sclerotic junction, either by a sawing motion or an onward thrust. The blade of the knife then lies free immediately underneath the conjunctiva, and should be still further rotated with its cutting edge forwards, or even forwards and downwards and the conjunctiva divided in this direction. By this means a conjunctival flap of not too large dimensions is formed which subsequently covers the wound. In making this section the knife should be entered at the extreme periphery of the anterior chamber, and should leave it in a similar position; care must however be taken not to introduce the knife too far downwards and inwards into the chamber before reaching the counter-punctuation and not to direct the point of the knife too far backwards, otherwise a large gaping wound will be made in the sclerotic implicating the ciliary body and exposing the vitreous humour, neither should the counter-puncture be in the transparent cornea; if a faulty puncture or counter-puncture be made the point of the knife should be withdrawn and inserted in the

desired position. The outer wound is almost altogether in the true sclerotic tissue while the inner is in the corneo-sclerotic junction. It happens sometimes that the point of the knife after dividing the sclerotic pushes the conjunctiva before it instead of piercing it and the aqueous humour escapes into the bag of the conjunctiva; this circumstance should not alarm us, nor prevent the section being quietly completed, but when the knife has been cut out the conjunctival opening should be enlarged with a scissors down to the point of counter-punctuation. With the completion of the section terminates the first step of the operation; the forceps is then given to the assistant who draws down the globe and the operator turns the conjunctival flap back over the cornea. The prolapsing iris being thus fully exposed is seized in the iridectomy forceps near one angle of the wound drawn but very slightly forwards and cut through with a straight or angular scissors as close as possible to the corner of the wound; its ciliary attachment is then freed by a touch of the scissors or torn through by drawing the forceps with the iris in it to the opposite angle, where it should be divided also as close as possible to the corner of the wound. In quiescent patients with moderately prominent eyes I sometimes make the iridectomy without having the globe fixed. It is very important to remove the iris up to its ciliary attachment as completely as possible, especially at the angles, for otherwise it is very likely to prolapse, retard the healing of the wound, and give rise subsequently to a cystoid cicatrix, which is peculiarly liable to become irritable. It requires some little care also to avoid cutting the conjunctiva with the scissors, it should therefore be carefully turned down over the cornea before the iridectomy. On completion of this second step the globe is released by the assistant, and if there be no complication the third step that of opening the capsule is to be forthwith proceeded with. If there be hemorrhage into the anterior chamber from the iris or conjunctiva it should be removed before lacerating the capsule, gentle upward movements of a spoon or eurette over the front of the cornea and slightly opening the wound will generally suffice to remove the blood. The laceration of the capsule seems to me the most difficult part of the whole operation and requires considerable dexterity and judgment. The operator fixes the eye, introduces the cystotome on the flat as far as the inferior border of the pupil where he gives the instrument a half turn, whereby its cutting sickle-shaped edge comes into contact with the convexity of the lens, and in this position he draws the instrument upwards and thus opens the capsule; it is well to make two cuts starting from one and the same point inferiorly—the one directed upwards and inwards, the other upwards and out-

wards; an incision along the periphery corresponding to the section is also advisable. In this manipulation great care is to be taken not to displace the lens—a thing difficult to avoid in old cataracts with tough degenerated capsules. If the lens be accidentally disturbed it should be replaced *in situ* by a hook or curette, otherwise its faulty presentation to the inner wound will cause difficulty in its delivery. If there be adhesions of the iris to the lens they should be divided with the cystotome. The fourth and last step consists in the expulsion of the cataract; the fixation forceps is shifted to one side of its former position, the convex smooth surface of a caoutchouc or tortoise-shell spoon which will not injure the corneal epithelium is placed on the lowest part of the cornea and pressed against it in a backward and upward direction; this pressure causes the lens to start and should be continued steadily backwards until the lens is fairly in the wound, when the pressure should be directed upwards by gliding the spoon along the cornea, following the movements of the lens until the whole cataract has been expelled; should portions of the soft cortex be stripped off and remain in the pupil they are to be pressed out by the action of the spoon on the cornea and by opening the wound. If there be any difficulty in expressing the lens the posterior lip of the wound may be slightly depressed while the pressure is continued below—an assistant fixing the eye; it is advisable at this stage of the operation however if fixation be necessary for the operator to control it himself, as improper pressure might easily cause loss of vitreous. In the majority of cases of ordinary cataracts this pressure properly directed will suffice to express the lens; in some instances however notably where there has been much loss of vitreous or where the vitreous is fluid it fails, and we must then have recourse to traction instruments, such as hooks or spoons; v. Graefe's hook bent in the stem so as to adapt itself to the convex posterior surface of the lens is introduced on the flat, given a half turn and inserted into or beneath the lens and the latter withdrawn, or a spoon is made use of as in the traction extraction. Where the vitreous is known to be fluid we should remove the lens with the hook without having recourse to pressure. Before bandaging the eye we should satisfy ourselves as fully as possible by testing the vision and otherwise that all portions of the lens have been removed: after taking the speculum away and allowing some time to elapse we should gently rub the upper lid over the globe by which means often small particles which had previously remained concealed behind the iris will come into view; these as well as pieces of capsule should be carefully removed as they are, if left behind, most likely to cause iritic complications and neoplastic formations; the time

thus spent no matter how long should not be grudged or considered illspent, for on the *complete* removal of the lens depends in a great measure the ultimate success. I am in the habit of testing the vision at this stage; in the ordinary cases where a cataract has been perfectly removed the patient should recognise and distinguish faces. All filaments of the blood and particles of lens are to be removed from the wound by means of a curette. In one instance of normal operation in which vision was as perfect as possible under the circumstances a small clot of blood remained at the inner angle of the wound, and with a view of removing it I seized it with the iridectomy forceps as I had often done previously; at the very moment however the patient made a sudden movement with her head and I saw the iris stretching and, before I had time to open the forceps, the ciliary attachment at its lower and inner side gave way and blood poured forth which quickly filled the anterior chamber; the reason of this was the fact that I had unawares seized in the forceps a piece of prolapsing iris which had been concealed by the clot of blood. I may mention that notwithstanding this serious and avoidable accident the patient after some months recovered very useful sight. The error I committed is instructive in several particulars—but more especially in showing how careful we should be to remove the iris completely at the angles of the wound; it shows also perhaps the necessity for having the patient's head held and steadied by an assistant during delicate operations on the eye; as a rule I do not adopt this practice in extraction, preferring to leave it to the patient's own sense not to stir, neither do I as a rule allow the patient to hold the hands of bystanders as I think it conduces generally to spasmodic movements which would otherwise not take place; the trust and confidence reposed in the patient are usually responded to by quiescence. When the operation has been completed a piece of fine linen or muslin about 5" \times 3" divided up the centre to the extent of about 2" is placed over the eyes the undivided portion on the forehead the division being occupied by the nose, the hollows around the eye especially at the inner angle are then carefully filled up over the linen by cotton wool and the cotton packed on so that its surface shall project beyond the level of the orbital margin and nose; over this is placed Liebreich's bandage and tied pretty tightly. By this means a uniform and equable pressure is kept up on and around the eyeball, and the bandage is so constructed that no movements of the patient's head can displace it, while it admits of being opened and reapplied and of the dressings being changed without disturbing the patient.—*Dublin Quart. Journal*, May 1870, p 313.

72.—ON A NEW OPERATION FOR REMOVAL OF POSTERIOR ADHESION OF THE IRIS.

By Dr. ALEX. OGSTON, Ophthalmic Surgeon to the Aberdeen Royal Infirmary.

[Cases of adhesion between the iris and crystalline lens usually go on unfavourably when left to themselves, the adhesion becoming greater in extent, and having more and more tendency to produce iritis. In the end the pupil becomes covered with the products of inflammation, and inflammation of the capsule of the lens interferes with its nutrition and leads to cataract.]

The treatment of adhesion between the iris and lens, posterior synechia, as it is called, is one of the least satisfactory parts of ophthalmic practice. In the cases of iritis and corneitis, where these are so apt to be formed, the use of atropine furnishes us with a means of preventing, in many cases, this annoying occurrence; but, in spite of the most careful treatment, adhesions often happen, and constitute a germ of mischief tending continually to progress.

When the adhesions are broad and extensive, no better or surer means could be wished for than the performance of iridectomy, which radically cures the whole mischief at the expense of a slight deformity. When, on the other hand, the adhesions are few and involve mere points of the pupillary margin, it would be greatly to be desired that we could break down synechiæ without producing deformity of the eye. The use of atropine commonly fails us entirely in such cases, and operation is the only means of attaining this end.

As a substitute for iridectomy in such cases, it has been proposed (Stellwag's *Augenheilkunde*, 1864, p. 179) to make a peripheral incision in the cornea with the usual iridectomy knife, then to introduce a peculiar flat hook, sharp at its concave side, and break down the adhesions by pushing with the convex side, or cutting them with the concave portion. It was hoped that this operation would succeed in an eye under the influence of atropine, but the proposal seems never to have found favour, and I am ignorant of what success, if any, is said to have attended it. The description of it would cause any experienced oculist to hesitate before even giving it a trial.

More recently (*Archivfür Ophthalmologie*, 1869) Dr. Passavant, in a letter to Professor von Graefe, suggests that limited adhesions of the iris to the lens should be broken down in the following manner:—The iris being under the influence of atropine, a peripheral incision, as for iridectomy, is to be made in the cornea opposite the site of the adhesion. The knife is then withdrawn, and an iris forceps is introduced, which, seizing the iris near the pupil, and at a point corresponding to the adhesion, is

made to drag the iris outwards towards the wound until the adhesion is seen to rupture. The forceps is then loosed from its hold on the iris by opening the blades, and withdrawn, the operation being thus completed. Dr. Passavant usually contents himself with the destruction of one adhesion at a time, and operates on another after an interval of a few days. He says—"In more than fifty such operations I have not met with a single injurious result."

This paper of Dr. Passavant appeared so honestly written that a trial of his method was instituted in the next case that presented itself in the Aberdeen Hospital. In this, as in all the cases where I have tried it, the operation was followed by no bad result as regards the iris; but, though the adhesion was seen to tear, the contraction of the pupil, which invariably followed on the escape of the aqueous humour allowed the two ends of the adhesion to lie so close to each other that they united again in spite of the free use of atropine, and by the time the corneal wound was healed the same state of matters existed as before the operation, only the adhesion was not so broad as previously.

In both the above-mentioned operations the fault lies chiefly in their necessitating the escape of the aqueous humour, and so permitting the contraction of the pupil which follows to bring the ends of the separated adhesions so close that they reunite. They show, however, with what impunity the iris may be manipulated, and that iritis is not even a usual result of careful and well-judged interference.

The following mode of operating on cases of limited adhesions for which iridectomy is too severe a measure is based upon two facts—first, that the iris is a structure sufficiently tough to resist very decidedly attempts to transfix it, and will be pushed before the point of a sharp instrument so as even to tear from its attachments rather than allow the sharp point to pass through it; and second, that if the aqueous humour be not permitted to escape, an instrument may be introduced into the anterior chamber, and the iris manipulated without causing contraction of an atropised pupil.

The pupil being put well under atropine, and the patient being under chloroform or bichloride of methylene, a spring speculum is fixed on the lids, and the operator fixes the bulb with a pair of forceps held in the left hand. The situation of the adhesion is now well studied, and, if necessary, concentrated artificial light is employed to render it distinct. This latter, however, is necessary only with feeble daylight or opacities of the cornea. A needle is now introduced through the cornea, near its sclerotic margin, at a considerable distance on one side of the adhesion, and in such a direction that, when pushed

onwards, it crosses at right angles that radius of the lens in which the adhesion is lying. The needle is pushed onwards into the anterior chamber, and so guided by the operator that its point becomes engaged in the pupillary margin of the iris at the root of the adhesion. The simple contact of the needle point with the iris is sufficient for this, and no attempt must be made to bury the needle in the tissue. By a gentle lever action of the needle point towards the periphery of the iris, the corneal wound being the fulcrum, the adhesion is broken down by being stretched and ruptured, and the needle being slowly withdrawn from the eye, the operation is completed.

There seems to be no reaction of iris or cornea consequent on this slight interference; on the contrary, I have found the dilatation of the pupil always keep the torn ends of the adhesion apart under the use of atropine until absorption had taken place.—*Medical Times and Gazette*, May 28, 1870, p. 579.

73.—ON THE OPERATION FOR ARTIFICIAL PUPIL.

By Professor LIEBREICH.

[The following is a translation of a note on the Operation for Artificial Pupil, which was read by Prof. Liebreich before the Academy of Sciences at Paris.]

The advances made by modern ophthalmology have so greatly increased the number of indications for the performance of iridectomy, that this operation has become one of the most important in surgery. In fact, it is well known that it sometimes produces a therapeutical effect, at others an effect purely optical, whilst occasionally the two effects are combined.

Other operative methods for artificial pupil, such as irido-dialysis and incarceration of the iris in the wound, have been completely abandoned for several years. At the present day the operation consists invariably in the excision of a piece of the iris.

It is hardly necessary to say that the form and extent of the excised portion must vary greatly in each particular case, according to the effect sought by the operation. Thus, for example, when iridectomy is employed as the sole and powerful remedy against the various forms of glaucoma, and certain forms of irido-choroiditis, the excision of a large portion of the iris must be practised, including both the ciliary insertion and the pupillary margin; in these cases, the aperture resulting from the union of the natural and artificial pupils assumes the form of a keyhole.

Should it be desirable, on the other hand, to obtain an effect

solely optical—that is, to give passage to rays of light when the natural aperture of the pupil is obstructed, by a partial and stationary cataract for instance—it would be generally preferable to make a narrow artificial pupil, for the same reasons that, in optical instruments, have governed the adoption of diaphragms with narrow apertures.

In some other cases—for instance, in central opacities of the cornea, with adhesion of the iris,—it is frequently desirable to excise a large portion of the pupillary margin of the membrane, and only a narrow extent of its periphery. If on penetrating more deeply into this question, the individual cases in these categories be analysed, it is impossible not to recognise the fact, that it is very necessary to be able to vary the iridectomy at will in order to render it as useful as possible in each individual case. But hitherto we have not been in possession of the very desirable means necessary to accomplish this end. We are ordinarily incommoded by certain difficulties in the mechanism of the operation. We have not the freedom of action necessary in order to vary the shape and size of the iridectomy according to the urgency of the case.

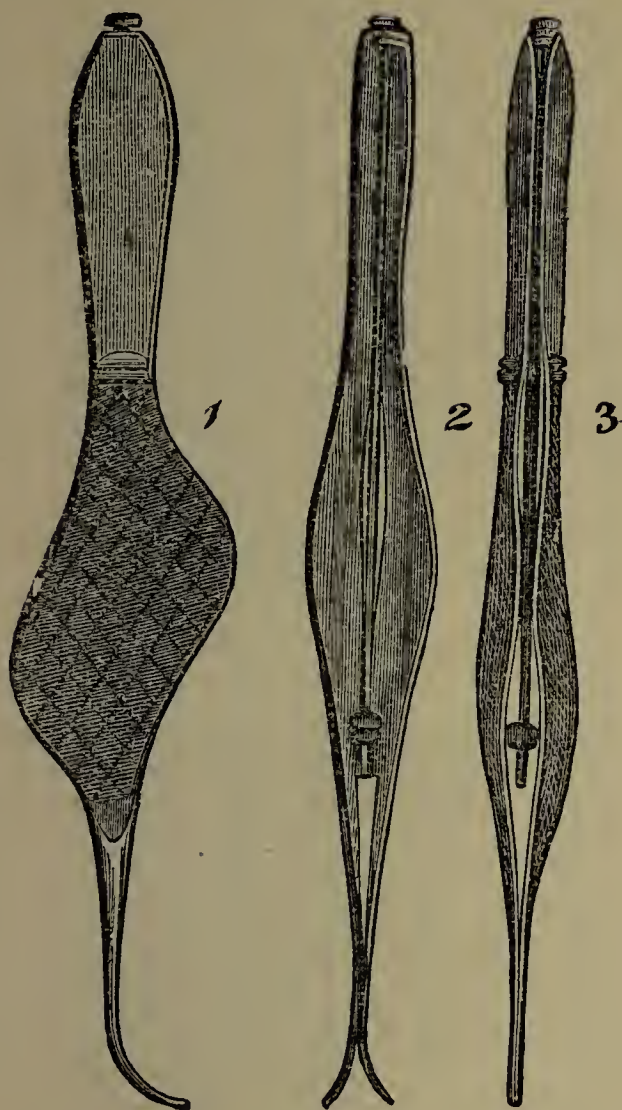
In the usual operation, after having made an incision in the cornea, a small pair of forceps is introduced into the anterior chamber, with which the iris is seized and drawn out of the wound, and a portion of it excised. But it is the size and position of the incision in the cornea which almost solely determine the shape and size of the excision.

For the forceps, which should always be introduced in a direction corresponding to the radius of the cornea—that is, towards the pupillary centre,—are limited in their expansion by the extent of the aperture in the cornea. If the grasp of the forceps has not been sufficiently extensive, and the portion of iris excised consequently is too limited, this fault can rarely be corrected after the first attempt, because a repeated introduction of the forceps is fraught with danger to the crystalline lens, which is no longer protected at this point by the iris.

In order to avoid these difficulties, and render the shape of the artificial pupil more independent of the dimensions of the corneal incision, which it is not always possible to make of the size deemed necessary, it has seemed to me desirable to substitute for the ordinary iridectomy forceps an instrument which it shall be possible to introduce through a narrow opening in the cornea, and which nevertheless shall expand widely in the anterior chamber.

It was necessary that this instrument should be capable of being introduced in any desirable direction other than radial.

Starting from these practical considerations, I have invented a new form of forceps, answering completely all conditions



requisite for iridectomy. The following is a description of the instrument:—

The limbs of these forceps do not open in the ordinary manner, but turn round a longitudinal axis in such a way that their rotation alone suffices to open and close their curved extremities. The movement of opening and shutting takes place without the part of the instrument which is engaged in the wound participating in the least degree: this part of the instrument, on the contrary, remains closed when the extremities are expanded. The size of the wound plays no part in the mode of action of the instrument on the iris. As a result of this circumstance, the introduction of the instrument is not limited to a radial direction; it may take place in a series of other directions,

all comprised in the extent of a segment of a circle of which the circumference is described by the curved extremities of the forceps taken as a radius, whilst the centre of the circle is the part of the wound in which the instrument is situated.

The application of these new forceps does not present the slightest difficulty. Holding then like a pen between the three fingers, they are opened by placing the index finger on the instrument, and closed by applying the middle finger.

The manufacture of the instrument is also sufficiently simple.

The principle on which the construction of these forceps depends has never been applied to any surgical instrument. I believe that this principle may easily be utilised for many other instruments; but I hope, above all, that it may render important services by perfecting the operation of iridectomy.—*Lancet*, July 2, 1870, p. 10.

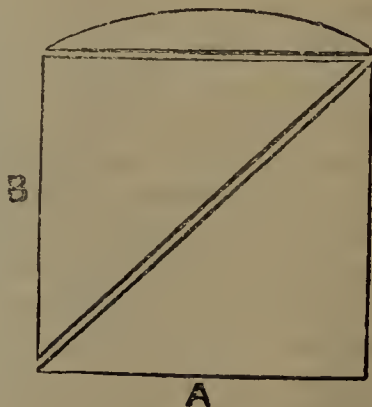
74.—ON A NEW FORM OF DEMONSTRATING OPHTHALMOSCOPE.

By ROBERT BRUDENELL CARTER, Esq., Surgeon to the Royal South London Ophthalmic Hospital.

[The following is an account of a new form of ophthalmoscopic object-glass contrived by Dr. Wecker, of Paris, and Dr. Roger. It appears to be a valuable instrument for the purpose.]

It consists of a plano-convex object glass, behind which are placed two rectangular prisms, the whole combined in the manner shown in the diagram, and inclosed in a brass box, with a handle beneath, and with openings on three sides. It is used with a mirror, as a simple lens would be, for the production of the inverted image; and its action is to divide the rays returning from the eye examined into two portions, which follow directions at right angles to one another.

The examiner, turning the lens towards the eye of the patient, and inclining it a little obliquely, sees the inverted image in the ordinary way, from light that passes through both prisms, at the side A of the compound instrument. A bystander at the side B sees an identical image from rays that have been reflected to the left, and sees it without requiring to exercise any skill in its production. He has only to put his eye in the track of the rays, and at such a distance from the instrument as the state of his own vision may require.



I need not say that the power to exhibit the fundus of the eye, plainly and clearly, to a second person, while at the same time examining it onesself, will often be of the greatest value for the purposes of instruction and consultation; and I am sure that Dr. Wecker's most ingenious invention cannot fail to be highly appreciated by many. It may be procured from Messrs. Weiss and Son; but I may mention that, in the first instrument sent to them from Paris for me, the prisms were packed in the box in wrong directions, and the desired result could not be obtained until they were properly placed. The prisms are of crown-glass, the hypotenuse of each subtending with the sides angles of 42° and 48° respectively. The plane surface of the lens is in contact with the adjacent prism, and the prisms themselves are held apart by morsels of velvet. Three lenses of different focal lengths are supplied with the case, and they may be exchanged without the prisms being moved.—*Lancet*, June 18, 1870, p. 870.

DISEASES OF THE SKIN.

75.—ON A NEW METHOD OF EFFECTUALLY REMEDYING
THE DEFECT OF HARE-LIP.

By Dr. WILLIAM STOKES, Jun., Surgeon to the Richmond
Surgical Hospital, Dublin.

All operations hitherto devised and practised for remedying the congenital malformation called hare-lip, present two prime difficulties to the operating surgeon. These are, the getting rid, or at all events diminishing the chances of, the subsequent occurrence of two deformities, which occasionally in truth but too frequently occur, after even the most skilfully performed operation, and for the avoiding of one of which, at least, as is well known, many and various plans have been recommended. The deformities I allude to are—first, the occurrence of a notch on the red border of the lip at the lower termination of the cicatrix, which, though not an invariable, is a most frequent defect; and, secondly, the vertical groove, which in nearly all cases hitherto operated on, exists to a greater or less degree, and which is produced by the contraction or falling in of the tissues at this situation. For this defect, when it occurs, there is, I may say, absolutely no remedy. To rectify the first of these, the occurrence of the notch, namely, no insurmountable difficulty presents itself to a surgeon of ordinary ingenuity and dexterity. It is unnecessary to allude to what has been done in this direction by Langenbeck, Malgaigne, Samuel Smith, of Leeds, and many other eminent

operating surgeons, as their recommendations, as well as those of other distinguished operators, are doubtless, already sufficiently well known to all practical surgeons. But I feel confident, that all who are possessed of experience in such cases will bear me out in stating, that the formation of a notch is a sequela which, if possible, should be avoided by all the means in our power; no matter how dexterously and expertly the operation may have been performed, its occurrence is the rule and not the exception. With regard to the second deformity I have spoken of, the vertical groove or sulcus, namely, it is notorious that hitherto no attention has been directed to its avoidance. It has long appeared to me that an operation which would efficiently get rid of the chances of both of these defects supervening, should be devised, and that if such were found possible, there would be then left, in dealing with the deformity of hare-lip, nothing to be desired.

To attain these objects the adoption of the principle of the utilization of the parings appeared to me to be essential. The operations, in which this principle has as yet been either in part or entirely adopted, are those of M. Nélaton, of Samuel Smith, of Leeds, and of my late valued friend and colleague, Mr. Maurice Collis. These procedures, however, ingenious though they be, appear to me to possess certain defects. The defects of M. Nélaton's operation appear to be that, while it utilizes the parings, it leaves in the ordinary situation of the notch a projection so great that a subsequent curtailment of it becomes a necessity. Secondly, it does not get rid of the vertical groove caused by the falling in or contraction of the tissues at the line of the cicatrix; and lastly, it is only capable of being adopted in cases where the labial cleft is extremely limited.

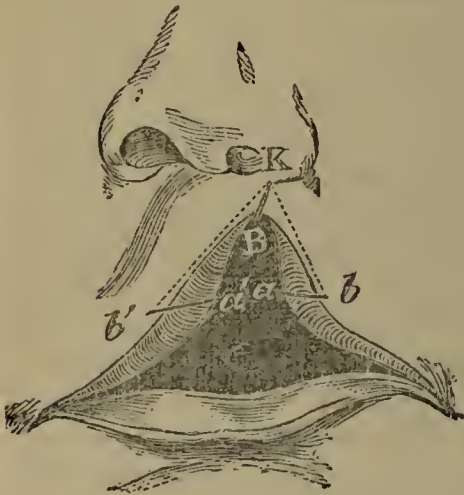
Mr. Collis' operation, ingenious though it be, is an extremely complicated procedure, and, in my opinion, possesses two other disadvantages, which are, the necessity of turning up the upper portion of the flap, attached to the ala nasi, which includes the entire thickness of the lip, and fastening it to the upper portion of the mesial flap, which does not comprise all the tissues of the lip. This turning up of the upper portion of the alar flap must obviously be accompanied by great constriction of its vessels, and the part must therefore be very liable to perish; and again, when this does not occur, a puckering at this situation takes place, which is in itself a considerable deformity.

But there can be no doubt that surgeons are much indebted to Mr. M. Collis for having prominently put before them the importance of utilizing the parings in operations for hare-lip. The operation known as Malgaigne's or Sédillot's, Mr. Collis states he "learned twenty years ago from a fine old English surgeon, Mr. Samuel Smith, of Leeds. He told me then that

he had devised it some twenty or thirty years previously. Whether he ever published it I do not know. This improvement consists in removing the lower portion of the parings at each side, and turning them downwards so as to form a prominence along the margin." (Dub. Quart. Jour., May, 1868.)

The steps of my operation may now be briefly stated, I may mention, in passing, that the complete incisions, or those through the entire thickness of the lip, are indicated in the accompanying diagram by black lines; the others, or those which do not go through the entire lip, are indicated by dotted lines. Having either removed the pre-maxillary bone (should it be displaced, which is the plan advocated by Mr. Adams) or placed into its normal situation, which can be done either by pushing it back immediately with a broad pair of forceps slightly curved, the opposing surfaces of the blades being covered with soft chamois leather, or if the projection be too great, by first removing a V-shaped piece of the vomer, as first, I believe, suggested and practised by Professor Langenbeck, of Berlin; or again, by adopting the plan of Boyer, of making for a considerable time previous to the operation a firm and steady pressure on the projecting bone; I then, with a curved scissors, divide all the false frena. I quite agree with the views held by the late Mr. Collis, as to the importance of preserving the true frenum, "its obvious use is to steady the lip, to prevent muscular action from drawing the centre of the lip away from its proper place." Again, he remarks—"The division of the frenum unsteadies the lip, makes it tend to run into a string, and in many cases leaves a permanent fistula into the nostril. It is, moreover, quite unnecessary, as the parts can be brought into perfect apposition without meddling with it." I should mention that previous to any cutting with either scissors or knife, in order to get rid of the great annoyance of hemorrhage, which in young subjects is a matter of grave moment, and in all cases, when it occurs seriously, interferes with the comfort of the operator, I invariably apply at each angle of the mouth one of the largest of the late Mr. Nunneley's artery forceps, and in all cases I have found that it effectually commanded the hemorrhage. Another advantage of these truly practical instruments at this stage of the operation is, that they enable the operator to dispense with the aid of assistants pressing with their fingers the lips in these situations, and of necessity impeding the operator to a greater or less extent. The forceps having been applied at each angle of the mouth, I seize the edge of the cleft at its lower extremity with a double hook, draw the parts forwards, in order to put them on the stretch, and with a fine narrow-bladed knife (Graefe's knife, for the new modified linear extraction operation, or a fine Pollock's

knife, answer the purpose remarkably well), I make an incision through the entire thickness of the lip, taking care, however, to stop at about two or three lines above the red border of the lip. I then make another similar incision on the opposite side. Two *serres fines* must then be applied to the extremities of these flaps, which have the two-fold advantage of arresting any hemorrhage, however slight, that may occur, and also by their weight making the flaps hang down below the red border of the lip, thus keeping them out of the way of the operator until the time comes for uniting them by a point or points of inter-



rupted suture. The two points, *a* and *a'*, can thus be brought down below the red border of the lip, thus forming a projection, and effectually getting rid of the subsequent occurrence of a notch in this situation. The next step of the operation consists in making a vertical incision (KB) through the entire thickness of the lip, with a small straight scissors at the upper angle of the cleft. This, of course, is only necessary in cases where the labial cleft does not extend into the nose. The making of the partial incisions at the edge of the cleft on either side, constitute the third stage of the operation, and for these the knives that answer best are either Graefe's cataract knife, a straight iridectomy knife, or Pollock's knife. These incisions are made going through fully two-thirds or three-fourths of the thickness of the lip from the upper point of the vertical incision K down to *b* on one side, and from K to *b'* on the other. Great care should be taken to prevent the knife going too far and wounding the mucous membrane of the lip. The two quadri-lateral flaps (KB *a b*) and (KB *a' b'*) united behind by the mucous membrane of the posterior aspect of the lip, can then with great facility

be turned back, and the broad raw surfaces of each brought into apposition. A tolerably strong well tempered spear-pointed needle should then be introduced from *b* to *b'*. In the great majority of cases one is sufficient. A second may, however, be introduced higher up, and the raw surfaces of the quadrilateral flaps approximated by an ordinary figure of eight suture. When, however, a second needle is not deemed necessary, the edges can be approximated and held together by fine entomologist pins, the introduction of which into surgery, from their being so singularly unirritating, is a real boon. For the point of suture below fastening the points *a* and *a'* the fine Chinese suture silk, which can be obtained from M. Lüer, of Paris, can be used with great advantage, as it is, of all the substances I have used for this purpose, the least irritating. Formerly, following the recommendation of Mr. Maurice Collis, I was in the habit of using largely horse hair for interrupted sutures. It is certainly a substance which when introduced into living tissues gives rise to little or no irritation. But notwithstanding this, I am not now as warm an advocate for it as I once was, in consequence of it being occasionally so brittle. For, in truth, I cannot but look on it as a very unfortunate circumstance, having, on a suture breaking, to reintroduce another needle and suture.

As yet I am unable to give more than the particulars of three cases in which I have practised this method of operating; but from the results I have obtained, a good idea of which can be got from the accompanying wood-cuts, I may, I think, fairly claim to have succeeded in attaining the two prime objects I had in view in setting out, which were, to get rid of all chance of the subsequent occurrence of the two defects which, as I stated already, so frequently supervene after the operation for hare-lip; namely, the notch at the red border of the lip and the vertical sulcus or groove corresponding to the line of the cicatrix. The chances of this latter defect occurring are rendered simply impossible, in consequence of the great breadth and thickness of the opposing raw surfaces; being, as they are, double the thickness of any other portion of the lip. The plan which I have adopted for preventing the formation of a notch also gets rid of the chance of that defect subsequently occurring. By operating in this way, therefore, we get rid of all the defects of the other procedures, in which, in part or entirely, the principle of the utilization of parings has been adopted. For—

First—No subsequent curtailment of the projection at the lower extremity of the cleft is necessary.

Second—The procedure is applicable to all forms and varieties of hare-lip.

Third—There is no chance of portions of the soft tissues perishing from any twisting of them.

Fourth—There can be no subsequent puckering.

Fifth—There can be no subsequent notch.

Sixth—The possibility of any vertical sulcus or groove in the line of the cicatrix is also prevented, which is the case after Sédillot's, Malgaigne's, Samuel Smith's, and, in truth, all other operations hitherto devised for remedying the defect of hare-lip.

[Dr. Stokes prefers to defer operating until after the period of dentition, principally on account of the weak, soft, and pulpy nature of the structures in the earliest period of infancy, and the bad effect of hemorrhage upon the system at that age.]—*Dublin Quarterly Journal*, Aug. 1870, p. 1.

76.—ON THE TREATMENT OF BURNS.

By FREDERIC C. SKEY, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

[The treatment usually adopted in burns, viz., earron oil and cotton wool, affords no relief to the acute sufferings of the patient. The patient recovers certainly, but we want recovery along with the least amount of suffering.]

The principle I am anxious to insist on as far preferable to any involved in the earron oil treatment is exhibited in the results of the application of heat to any small burn on the hand, as from a drop of melted sealing-wax. The very smart pain occasioned by this trivial accident is entirely relieved by immersing the hand in hot water, or by holding the hand to the fire for a few minutes. If this be a fact—viz., that by the brief application of an agent promoting pain (for *heat* is not essential) one important element of the injury, that of pain, is quickly relieved,—there must be some virtue in the principle involved. And there is a virtue, and a very important one; for I maintain, from many years' experience in the treatment of burns, that not only is the pain far more quickly relieved, but that the cure is hastened in the same proportion.

Some half a century since this principle of treatment by local stimulants was enunciated to the profession by Dr. Kentish, of Bristol. Its value was at once acknowledged by observing men; and I think I am not mistaken in asserting that the principle was adopted in the majority of the hospitals of the metropolis, if not in all. I know that it was thoroughly appreciated by my own teacher, Mr. Abernethy, who would naturally influence the opinions of a considerable proportion of the profession. The agent employed by Dr. Kentish was spirit of

turpentine, which was applied, diluted or otherwise, over the affected surface. The application was accompanied by an increase of temporary pain, which, however, passed off in the course of a few hours, and thus improved the condition of the patient. The amount of pain was in relation with the extent and severity of each injury. How it has happened that we have reinstated the fomentation and carron oil system again I know not. I don't understand how a surgeon who has once adopted the application of treatment by local stimulants could abandon them for a negative principle of oils or warm water. I wish to recommend to your recollection the employment of a remedy on the same principle I have for many years resorted to both in St. Bartholomew's Hospital and elsewhere—viz., a solution of nitrate of silver in a proportionate strength to the extent and severity of the burn. I have used the solution in the strength of from five to twelve or more grains to the ounce of water. The lotion would, of course, be modified by the age of the person, five grains, or about five, sufficing for a child. If the whole surface be freely bathed with the solution, and entirely covered up in cotton-wool, and a moderate opiate be administered in a glass of brandy-and-water in strength proportioned to the age and habits of the patient, with the object of counteracting the sense of chilliness that will otherwise necessarily follow in all these cases, I think you will find you have made a good start in the future management of your case. In all cases, whether of burn or scald of the external skin, I say, resort to local stimulants. The soft and soothing system, I believe, answers no useful purpose whatever beyond that of excluding air, if that be, as supposed, a great desideratum.

I prefer the solution of nitrate of silver to the turpentine of Dr. Kentish, because it can be made of variable strength to suit each individual case, and the relief it affords after its first application is yet more complete than that afforded by the latter remedy. The theory of the excellent results of the treatment of burns by provocatives, or remedies that provoke physical pain, is not very clear. It would appear that relief invariably follows a temporary increase of pain; but one is inclined to ask whether the benefit consists in the actual presence of pain, and how far the same agency—whether of fire, hot water, turpentine, or the nitrate-of-silver lotion—would be equally beneficial when the subject of the injury was placed under the influence of chloroform. This question I must refer to others more fortunate than I in having at their command a larger field of inquiry than now falls to my lot.

My advice to you is, to abjure carron oil and all demulcents, and to adopt the treatment of burns and scalds by local stimuli.
—*Lancet*, Aug. 27, 1870, p. 285.

77.—ON CICATRICES FROM BURNS.

By FREDERIC C. SKEY, Esq., C.B., F.R.S.

[Cicatrices from burns occur chiefly in the regions of the face and neck, the axilla and the elbow. The distortions produced as is well known are sometimes frightful.]

With a view to remedy these evils, I have on several occasions resorted to the Taliacotian operation; dividing freely, and dissecting off the morbidly contracted skin, and replacing it by sound skin from the neighbourhood. But, on the whole, the treatment has failed. It is sound in principle, but my experience would not, in my hands, justify the future resort to it; either the reunion of the apposite surfaces has failed, or the new integument has sloughed, or some other untoward circumstance has occurred to mar the success of the treatment.

For several of the latter years of the tenancy of my office of surgeon to the hospital I adopted, in these and similar cases, a new principle of treatment far more efficacious than that I have described. This principle requires a few words of explanation. If you observe the healing progress of an ulcer, be it where it may, you will not fail to notice the gradual declension of healing power the wound exhibits as it advances, so that an ulcer of four inches diameter requires for the last inch as much time to heal the entire wound as has been occupied in the healing of the previous three inches. It would appear that the curative or healing action became exhausted and the progress towards complete cicatrisation in the same degree retarded. It is this tardy progress in the healing process of wounds that explains the condition of these singular cases, and renders them so difficult of control. Almost every description of open wound, as you well know, heals from the margin. There are exceptions to this natural law in the case of old phagedænic ulcers, in which an island of cicatrisation forms in the midst of the granulations; but I do not recollect to have seen this feature in any common wound. The healing power of a wound is in a relation with the extent of its margin, a wound of four inches square having a healing margin, and therefore a healing power, of 16 inches. Divide this wound into four, of one inch each, and you have a healing margin of 64 inches. Again divide it, in theory I mean, and you have a margin of 128 inches. Now. if the fact I have stated be true, that the healing process of wounds is retarded at every step it takes, you will readily see that the smaller the wound the more rapid the healing process; and, if instead of one large wound, you make twenty small wounds, the healing process is completed with great rapidity, and the evils attendant on these large cicatrices may be removed by very simple means—viz., the relaxing the tension caused by

these bridles by making a large number of small divisions of the cicatrix instead of one large one. Carrying into execution this principle, I have treated these cicatrices by small incisions in various parts of the body for some years. In my first case, in which the thumb of an in-door patient was attached to the index finger, which had resisted various efforts to permanently dis sever it, I fixed the thumb in full abduction by some slight mechanical agent, and then made about eight to ten incisions through the skin and subjacent tissue, each incision not exceeding eight or nine lines in length. In ten days the man had perfectly and permanently recovered the entire use of his thumb. I then adopted the principle on a larger scale in the neck and at the elbow joint, and I am quite satisfied of its soundness. I believe the smallest possible margin to each wound will suffice for the cicatrising process, and the incisions should be made with all caution that they do not run into each other.—*Lancet*, Sept. 17, 1870, p. 395.

78.—ON THE TREATMENT OF ENLARGED LYMPHATIC GLANDS.

By FURNEAUX JORDAN, Esq., Birmingham.

[The following is an abstract of Mr. Jordan's paper read at the meeting of the British Medical Association at Newcastle, in 1870.]

The numerous modes of treating enlarged glands are remarkable chiefly for their want of success. The method I now propose, if carefully carried out, I have never known to fail. The ordinary enlargement of lymphatic glands is due to inflammatory action. By far the most efficient remedy in inflammation of any organ is counter-irritation, if only it be established in the *proper locality*, and to a proper extent. A blister will cure bursitis when nothing else will, and inflammation of a bursa does not differ from other inflammations. In enlarged glands, as in abscess, carbuncle, boils, and erysipelas, the best locality for counter-irritation is *not over* the inflammation, but around it or adjacent to it—in short, in an independent vascular region. In enlarged cervical glands, a large patch of iodine irritation at the back of the neck, which may be prolonged below the glands, will certainly prove successful in a short time.

A shot bag, as heavy as can be tolerated, should be applied over the glands at intervals during the day, the patient being for this purpose in the horizontal posture. I might cite many cases. One, a representative one, under the care of an impartial and competent observer, will suffice. Dr. Hickinbotham, of Nechells, had under his care a man with enlarged cervical

glands, which, for three years resisted the careful trial of every known treatment. Dr. Hickinbotham then, adopting my views, established a patch of counter-irritation at the back of the neck. In three weeks all enlargement had disappeared.

One of the advantages of counter-irritation is this—it gives certain and immediate relief to pain. The persistent tormenting pain of a carbuncle for instance, may be instantly relieved by a ring of counter-irritation with its transitory smarting.

79.—ON THE TREATMENT OF HERPES CIRCINATUS BY LOCAL ASTRINGENTS.

By Dr. CHARLES H. ROBINSON, Demonstrator of Anatomy to the Ledwich School of Medicine, Dublin.

[The treatment of herpes circinatus by local astringents generally answers all the purposes necessary, without constitutional or other medicines being required. The most suitable astringent applications are tincture of perchloride of iron, sulphate of copper, and tincture of iodine. The following are a few cases illustrative of this treatment.]

Case 1.—14th February. Charles F., aged 15, I saw this morning with a cluster of herpes circinatus on forehead and behind left ear, circular in shape. Each spot touched with iodine tincture. 15th. Iron tincture applied to each spot; itching less. 18th. Sulphate of copper used. 20th. The spots on forehead and behind left ear are gone, but two fresh patches have appeared—one at angle of mouth, the other on left cheek. The sulphate of copper was daily applied, and on the 24th he was cured.

Case 2.—16th March. C. B., aged 17, I saw with a herpetic patch (crescentic) under one axilla; applied sulphate of copper to it. 19th. Same treatment continued. Several smaller patches have appeared, some on back of neck, others in axilla; tincture of perchloride of iron to each spot, and on the 23rd March he was free from them.

Case 3.—8th April. James T., aged 25, came to me with four patches of herpes circinatus on right fore-arm; tincture of perchloride of iron applied to each. 10th. Itching gone. 13th. Several new spots have appeared. On the 18th April he was cured.

Case 4.—4th May. I saw James Y., aged 15, with several spots of herpes circinatus on right side of upper lip and on the chin; tincture of iron applied. 5th. A great number of spots have appeared since yesterday; to use zinc ointment twice daily. 6th. Face covered with the eruption, spots between the

eyes, on forehead, cheek, chin, &c. 8th. Used the perchloride of iron instead of zinc ointment; on the 13th May cured.

Case 5.—5th May. Charles F., aged 16, came to me with three herpetic spots on left cheek; applied sulphate of copper to each. 7th. Several new patches have appeared; opened each vesicle as it appeared, and touched the centre with blue-stone. 8th. Another patch on left shoulder; tincture of iron applied to each. 10th. Two new spots on right hand; tincture of iodine to each. 12th. Cured.

Case 6.—24th August. Edward Q., 28 years of age, I saw with a herpetic patch, size of half-a-crown, on right arm, another smaller one on left arm; tincture of perchloride of iron applied. 26th. Itching gone. 27th. Tincture of iodine used. 30th. Another spot, size of a five-shilling piece, on back; same treatment was used, and on the 4th of September he was cured.

It will be seen from this that the result of the astringent treatment was as follows:—Case 1 lasted ten days; Case 2 seven days; Case 3 ten days; Case 4 nine days; Case 5 seven days; Case 6 ten days: making an average duration of less than nine days each, which, considering the nature of the cases, all being of the relapsing kind, I believe to be very favourable.

It may be remarked that although herpes circinatus is a disease essentially of youth, yet two of the above cases were in adults—one aged 25, the other 28 years of age.

I may mention that all these patients were inmates of the same institution, being under the same hygienic and dietary arrangements; but how it originated I am unable to say. No special cause can be assigned for it; sometimes, according to Cazenave, it is supposed to be produced by cold, or by the application of irritating lotions.

That herpes circinatus is contagious, is, I believe, now generally admitted, although formerly denied by some eminent dermatologists, Cazenave among the number. That the above cases prove its infectious powers I do not affirm; still I think they give rise to a strong suspicion that such was the fact, especially when it is remembered that they were all in constant communication, using the same towels and washing appliances; and therefore very liable, if it was contagious, to take it from one another.—*Practitioner*, July, 1870, p. 24.

80.—CASES OF SKIN GRAFTING.

[The following is from the *Lancet* Reports of Practice in the London Hospitals.]

Mr. Francis Mason, at the Westminster Hospital, has performed the operation of skin grafting on granulating surfaces

in nine instances. Five of these cases are now under observation.

The first was that of a girl with the cicatrix of a burn in the neck, of which a separate and detailed account will be given on another occasion.

The second was that of a woman who for three years had had an ulcer on the leg, measuring about four inches by three. Three pieces of skin, of the size of a canary seed, were snipped from the front of the upper arm, and simply placed on the ulcer, and retained in position by means of a strip of transparent plaster, made by Ewen of Jermyn Street, and over this water-dressing and a bandage were applied. At the end of a month the ulcer had nearly healed, each of these pieces having in a fortnight attained the size of a fourpenny-piece.

The third case was that of a man with a flabby-looking ulcer, as large as the hand, situated in the groin. Four small pieces from the front of the upper arm were grafted. Three failed to grow, and the fourth, after one month, was only of the size of a pea.

The fourth subject was a woman with an unhealthy ulcer of the leg, extending nearly all round the limb. Four pieces were grafted, and they all failed to grow.

The fifth, a woman, with an ulcer of the leg, of four years' standing, and two by three inches in size. Two pieces of skin were grafted, and in three weeks measured each a quarter of an inch in diameter.

The sixth, a man of middle age, with an ulcer of the leg, four by three inches in size, of nearly four years' standing, which was sloughing at the time of admission. Charcoal and linsced poultices were first applied, and the wound soon showed fairly healthy granulations, on which four pieces were grafted; and on the strips being removed four days later, they were all found to have adhered. When seen eleven days after the operation, they were spreading rapidly.

The seventh, a girl, aged 20, with a flabby ulcer on the thigh, of eight months' standing. Two pieces were grafted with good result.

In the eighth and ninth cases there were smaller ulcers, in which one piece only was grafted. They rapidly recovered.

Mr. Mason, without committing himself to a decided opinion on this interesting operation, believes that its success depends on the ulcer being, if not in a healing condition, at least of a healthy character. He had understood from Mr. Pollock, who first showed him the operation, that the grafted portions often disappeared for a time, and were, as it were, reproduced in the course of a few days. Mr. Mason has never noticed this phenomenon. In his successful cases the grafted pieces have,

on the contrary, never faded away or diminished, but remained centres of centrifugally spreading growth. They have in some instances assumed, in the course of a few days, a cupped or depressed appearance, as if a kind of very superficial ulceration were proceeding; but they have ultimately filled up again, and the process of healing has proceeded. The pieces of skin have only disappeared in cases where they have perished. The situations most favourable for this procedure are, Mr. Mason thinks, those where—as in the case of ulcers of the leg—pressure can be readily applied, so as to keep the grafted skin permanently fixed for three or four days.

Perhaps the difference between the results of Mr. Mason's experiments and those of other operators, as to the disappearance of the transplanted skin, may be accounted for by the rather larger size of the portions (picked up in an ordinary dressing forceps) which he cuts off.—*Lancet*, Oct. 22, 1870, p. 566.

81.—RADICAL CURE FOR CORNS.

We are glad to find a radical cure for these torments of civilised life, suggested by M. de Pontevés. It consists of the destruction, both of the cuticular cuirass and the underlying cutis. The surface is covered with a vesicating plaster well charged with cantharides powder. After leaving this on twenty-four hours the cuticle will be found raised all around the "cuirass" of the corn; this is now taken off and a coating of tannin laid on the exposed and tender surface, then a tannin ointment laid over the part, the rationale being, firstly, the destruction of the cuticular covering, and then the application of the tannin to the gelatinous cutis—in fact, "tanning the corn."—*Medical Press and Circular*, April 20, 1870, p. 319.

82.—PROPOSED METHOD TO PREVENT PITTING AFTER SMALL-POX.

By JAMES STARTIN, Esq., Senior Surgeon to the Hospital for Diseases of the Skin, Blackfriars.

The fearful epidemic of small-pox now raging in Paris and elsewhere, inclines me to bring forward a former suggestion of mine to prevent the "pitting" consequent upon this frightful disease, where it exists in a moderate and not in the virulent and lethal forms. This plan was published several years ago; but, for the obvious reason that my practice is chiefly confined to the treatment of chronic diseases of the skin, I have had few opportunities of verifying it by experience, although, whenever a chance has occurred for doing so, the expedient referred to

has seemed to have accomplished the end anticipated. I would preface my suggestion by the mention of two axioms which have guided me in its proposal. The first is, that it is the characteristic of small-pox to form a slough under each individual pustule; the second, is an affirmation by John Hunter, that two similar diseases cannot coexist in the system at the same time. "For example," he states, that "if you can succeed in changing the nature of an inflammation, you can often cure the original complaint." Blistering in erysipelas, and Higginbottom's method of vesication with nitrate of silver, are familiar illustrations of this Hunterian law. The plan which I have proposed with the above ends in view is, as soon after the precise nature of the small-pox eruption becomes manifest, to blister, by means of a small camel's hair-brush, each individual pustule, with the ordinary vesicating liquid of the Pharmacopœia, or with the "liquor vesicatorius," made by Bullen, or with the blistering caustic of the Skin Hospital Pharmacopœia. The face should be previously washed with a little pure ether, or with rectified spirit of wine, to remove any secretion from the skin which might interfere with the action of the blistering fluid. When the parts required have been painted over with the vesicator, and the skin, by turning white, shows that the blister has taken due effect, the pustules, or, if the eruption be confluent, the face, should be varnished over with flexile collodion made after the plan I originally suggested; viz., by adding clarified neat's-foot or lard-oil to the collodion, instead of castor-oil, as directed in the British Pharmacopœia. This, it will be found, forthwith allays the pain of the blistering, and at the same time limits its effect to the circumscribed point to which it has been applied, which should hardly if at all exceed the apex of the pustule in extent.

It may here be useful to mention that flexile or elastic collodion has these singular and marked effects, not only in the instance now alluded to, but also in the case of burns and scalds, even with the strong mineral acids; so that I have constantly treated such injuries from the action of nitric acid, or from gunpowder &c., by this method of varnishing with elastic collodion, or where the skin has been broken, by first covering the part with blotting-paper, soaked in glycerine and water, to imitate the cuticle, and then varnishing with the flexile collodion, which procedure I have found, as in the case of small-pox, not only prevents the dreaded slough, but also promotes the healing of the part without mark or scar, and this in a shorter time than by any other other method of dressing with which I am acquainted. But to return to the case of small-pox: after the blistering and collodion has remained intact for eighteen or twenty-four hours, a lotion, compound of starch

and glycerine, plasma, as it has been termed, or glycerine jelly, may be applied two or three times a day by means of a flat camel-hair brush, so as thinly to cover the part and exclude the atmosphere and its drying effects.

Although I have mentioned the early periods of the eruption of small-pox as most advantageous for the prophylactic treatment indicated, yet it may be applied (of course with less chance of success) at any time during the eruption, except at the last or sloughing stage.

I could mention a few instances in confirmation of the advantages of this plan; but I will cite one only, the case of a Miss N., the daughter of a late physician. This young lady had several pustules of small-pox, on the face and neck, as well as elsewhere. All those within sight were blistered and collodionised, save one near the ear, which was left by the wish of Dr. N. to test the process. In every case where the blistering was applied no mark of pustular slough remained; but on the selected spot, as on a few other places which were overlooked, there were most evident signs of the disfigurement of the disease, the marks of pitting remaining until this day.

It would be a source of much gratification to me if any of my *confreres*, either in this country or Paris, whose opportunities are greater than my own, would make trial of the foregoing method, and favour me or your readers with the result.—*Brit. Medical Journal*, June 18, 1870, p. 623.

SYPHILITIC AFFECTIONS.

83.—ON THE USE OF SARSAPARILLA IN SYPHILIS.

By Dr. T. CLIFFORD ALLBUTT, F.R.S., Physician to the Leeds Infirmary.

One of the most curious examples of a rise and fall in popularity is the present estimate of the use of sarsaparilla in syphilis, when compared with the estimation in which it was held some years ago. The specific virtues of few drugs have been so highly vaunted as this supposed virtue of sarsaparilla; scarcely any drug in the *Pharmacopœia* is now so much neglected. It has been a matter of reproach to us that medicines praised one day are despised the next, and the reproach is not, perhaps, without justice. In some instances drugs are discarded for good reasons; they are, and deserve only to be, the invention of a day. In other instances, as may be the case with acupuncture or with carbolic acid in surgery, success depends upon a number of conditions which it is difficult to unite, and methods of treatment fall into disuse on account of some com-

plexity in the conditions of their use rather than on account of any worthlessness in themselves. The adoption and disuse of sarsaparilla, however, have no such excuse as this; the revelation of its virtues is to be had with little trouble and under simple conditions, and its disuse has been due only to a curious result of routine. The fact is, the antisymphilitic effects of sarsaparilla depend upon the dose in which it is given. Because decoctions and infusions are supposed, in all well-regulated prescriptions, to be given in the quantities of two table spoonfuls three times a-day, so sarsaparilla was supposed to be no exception to this arrangement, and in doses of one ounce it was accordingly given. I myself was a victim to this routine, until my attention was drawn to its use in the practice of my late friend and colleague Mr. Samuel Smith, so long the eminent and successful senior surgeon to the Leeds Infirmary.

Mr. Smith gave the remedy in doses of one and two pints a-day, and with great success. So convinced were his colleagues of the value of sarsaparilla when administered in adequate doses, that I believe I am at liberty to say that many of them still find in large doses of this drug one of their best remedies. The only excuse I have for bringing the subject forward is, that the treatment has been in use for a quarter of a century at least in the Leeds Infirmary and no one has yet published the results. I may add that, as I have formed a special class for diseases of the skin, so it may be that the antisymphilitic remedies have been more needed in my practice on that account. It is only as a follower of others, however, that I can speak on this subject at all. The remedy is used by us as a decoction, which is made in the infirmary in large quantities. Of this decoction, which differs only in unimportant details from the compound decoction of the Pharmacopœia, we administer from four to ten ounces three times a day, or prescribe some such quantity as a pint or a pint and a half to be taken at will during the twenty-four hours. This medication is expensive no doubt, but that treatment is the cheapest which most quickly cures the patient. The cases in which sarsaparilla is most useful are cases in which the system is thoroughly infected with syphilis, during the tertiary and visceral modes of its appearances.

In persons who are in a thoroughly cachectic state, who have lost flesh and strength, and who are suffering from sluggish ulcerations and indolent gummata, the sarsaparilla is really of very great value. I believe there is scarcely a practitioner among my readers who will not rejoice to hear of a remedy which will help him to cleanse and to re-establish old syphilitic patients,—patients whose constitutions have been undermined by want of nourishment or by excesses, who have gone through

many courses of mercury, whose irritable mucous membranes will not bear any more iodide of potassium, and who are so sallow, so worn, so broken down, so eaten up by disease as to seem fit only for the grave. These persons clear up on such quantities of sarsaparilla as I have named, and it is here that the drug fills so important a gap. It need not, and it will not, supersede mercury and iodide of potassium in straightforward cases, but it has its place where these means have failed, or where they are on some grounds to be avoided. How far we are right in claiming this important place for sarsaparilla can only be known after an extended use of the drug according to our method by the profession at large. No array of my cases can do more than illustrate my opinions, and one or two instances will do this as well as a score.

Take, for example, the following: — is nominally a laundress, and by practice a prostitute. She is evidently worn down by excesses and irregularities, and will soon be worn out. Her face is sallow and wan, her frame is wasted, her voice is hoarse, her hearing is dull. She has enlarged hard glands in her neck and groin, scars at the angles of her nose and mouth, coppery tubercles about the forehead and eyebrows, a lump of gum-mous matter in the calf of the right leg, nodes on her tibiae, and open ulcers on her face and upon her legs. These ulcers are large, numerous, indolent, and characteristic. She makes no secret of her disease, and dates its origin several years ago. She “has had mercury,” and her gums bear the traces of it; her irritable tongue and stomach, her anorexia, and her wasting seem to warn us against the iodides. She took sarsaparilla, beginning with half a pint a day, and increased the dose to one pint daily. On this treatment her complexion cleared, the ulcers contracted and healed, she gained flesh and appetite, and in two months she was restored to something like good health. On account of the expense of the drug I often wished to change it for the iodides of iron and potassium, but having found the benefit of the sarsaparilla she begged me not to omit it, and recognised its virtues with the greatest gratitude. This girl was an out-patient, and therefore placed under no new conditions of food or rest.

The next patient whose case I will relate is now an in-patient, but I took her from a gentleman's house where she was much valued as a servant, and had been living with every comfort. I took her in on the 5th of Feb. last, and drew general attention to the case and its treatment in order to test the drug once more for the purposes of this paper. The girl on admission was worn, wasted, and sallow; she had coppery tubercles about both eyebrows, about the *alæ nasi*, and the right angle of the mouth. Her hair was thin, and her scalp tender, and she had

nocturnal pains. On the left cheek over the zygomatic process was a soft gumma about the size of a cob-nut. She dreaded its breaking upon her face, for such lumps had formed in the flesh of her arms and legs, and had burst, giving rise to large ulcers. She was now infested by such ulcers, so as to present a pitiable object. They were on both legs, both above and below the knee, and presented the characteristic punched-out appearance of syphilitic ulcers. They varied in size from that of a shilling to a crown-piece, and there were perhaps seven or eight of them on the two legs. She had been under medical treatment for some time before admission. I ordered her four ounces of decoction of sarsaparilla three times a day, intending to increase it to six ounces. The increase was, however, unnecessary, for she began quickly to improve in complexion, to gain flesh and strength, and to take food. Coincidentally with this the ulcers began to close, contracting from their edges towards the centre, the coppery tubercles faded, and the gumma in the muscles of the cheek died away. No local applications were used except simple dressings. I write at the end of one month from her admission, and she is well, or what she calls well. I should now advise for her a gentle course of biniodide of mercury for a week or two, followed by a prolonged course of iodide of potassium.

I will only select one more case from a large number of similar ones. Mr. —, a gentleman of fortune, who enjoyed every advantage in conditions of life and skilled advice, had never been able to shake himself free from an old syphilis. He had no cutaneous eruption of importance, but was spare, haggard, and sallow; his hair fell off, his appetite was capricious, his bowels irritable, and his strength deficient. He was liable also to neuralgias, which were really dreadful, often amounting to great agony. They were chiefly cranial, but also of the nocturnal tibial variety. There were many irregularities of the cranium and of the flat bones. Mercury and iodides, though administered under first-rate advice both in England and in Germany, had failed to relieve him; for they were so ill borne that no continued course could be prescribed, whether combined with tonics and nutrients or alone. I advised him to lay in a quantity of sarsaparilla, and to have the decoction made at home, so that he might take it in quantities daily. The medicine agreed with him, and he tried it carefully. He took at most about two pints daily of the Pharmacopœia strength, and he took this for about three months. Altogether he took more or less sarsaparilla for about five months. He found his improvement so satisfactory, that I had no difficulty in persuading him to continue the treatment. His general nutrition improved first, and the "cachexia" abated; in the next place his neural-

gic pains diminished and disappeared. Since this time nearly two years have elapsed, and he has remained healthy and vigorous beyond the average of men, being able to hunt four days a week and to carry out many important engagements without any signs of fatigue. Such is our mode of administering sarsaparilla at the Leeds Infirmary, and such are the cases which need it. I hope soon to hear that our practice has been found useful by our brethren elsewhere.—*Practitioner*, May, 1870, p. 257.

84.—ON THE USE OF MERCURY IN THE TREATMENT OF SYPHILITIC AFFECTIONS OF THE SKIN.

By Dr. McCALL ANDERSON, Professor of the Practice of Medicine in Anderson's University, Glasgow.

[While mercury is of little use in the treatment of non-specific affections of the skin, except in so far as it is of value as a purgative or corrector of digestive derangement, it is invaluable in appropriate cases, in syphilitic affections.]

We are justified in bringing the patient fairly under the influence of mercury under the three following conditions, although it is not always necessary to touch the gums, and certainly in no case should salivation be courted.

1st. When we have to treat one of the earlier of the cutaneous manifestations of syphilis in a person of sound constitution.

2nd. When the syphilitic poison has not only attacked the skin, but also some delicate organ, such as the eye.

3rd. When, in a person of sound constitution, we have to deal with a circumscribed syphilitic eruption of old standing, which resists external applications and iodide of potassium in full doses.

A gentleman, resident in the West Highlands, consulted me a couple of years ago with regard to an obstinate syphilitic eruption of old standing, implicating and limited to, the soles of his feet. The patches were slightly coppery in tint; their edges were composed of segments of circles; and the skin was for the most part thick and almost horny. He had taken iodide of potassium *ad nauseam*, and had tried all kinds of external applications, including the use of blisters, under the direction of one of the most celebrated surgeons of the day; but to no effect. He was an exceedingly strong and healthy man, and I had therefore no hesitation in giving him a course of mercury. Within three weeks the eruption had completely disappeared, and there has been no return since, while his general health remains as perfect as before.

Instead of administering mercury by the mouth the process of subcutaneous injection, as recommended by Lewin and others, may be tried—a mode of administration from which I have obtained excellent results. Four grains of the perchloride of mercury should be dissolved in an ounce of distilled water, and of this from seven and a half minims at the least (*i. e.*, a sixteenth of a grain) to fifteen at the most (*i. e.*, an eighth of a grain) should be injected once daily. It is indifferent where the injection is made, except that the least sensitive parts and the parts least liable to pressure should be selected. It possesses the following advantages:—1. The dose can be regulated with the utmost precision. 2. The medicine has no tendency to derange the digestive organs. 3. It acts with greater rapidity than when the perchloride is administered by the mouth. (Three or four weeks usually suffice for the cure.) 4. A much smaller quantity is sufficient to produce the desired effect (about three grains on an average). 5. It does not usually produce salivation, although stomatitis is a frequent result. The process has, however, the following disadvantages:—1. The operation is somewhat painful, and much pain is experienced for several hours after each injection; so that patients sometimes object to its continuance. 2. In exceptional cases—once in about two hundred injections (Lewin)—the operation is followed by circumscribed inflammation and abscess.

Another mode of employing mercury is in the form of the *mercurial vapour bath*, which is specially valuable in the treatment of syphilitic ulcerations of the skin, and also of syphilitic eruptions occurring in cachectic subjects; but I am not prepared to coincide with those who laud it as the most effectual, although it is undoubtedly the safest, method of bringing the system under the influence of mercury in every case. The preparations which are most frequently employed for this purpose are the subchloride and the bisulphuret; of which half a drachm of the former, and from a drachm to two drachms of the latter, may be used for each bath. The mode of carrying out this treatment, and its special advantages, have been fully discussed by Mr. Langston Parker and Mr. Henry Lee, to whose writings I must refer you for further details.

In syphilitic eruptions occurring in infants, the subjects of hereditary taint, mercurial treatment is certainly curative, provided it is commenced before the poison has had time to produce profound syphilitic cachexia. Indeed, there is no other treatment which appears to have any material influence over the disease; so that, in my opinion, to withhold mercury in such cases is altogether unjustifiable.

As a rule, the most simple and most satisfactory way of treating infants is to rub into the eruption, night and morning,

an ointment containing mercury, such as I have indicated in a previous section, or to make use of the mercurial belt. A piece of mercurial ointment the size of a bean should be rubbed daily upon the inside of a piece of flannel two and a half inches broad, and sufficiently long to surround the body of the child about the level of the umbilicus, and this should be worn until two or three weeks after the complete disappearance of the symptoms. Should the ointment, however, irritate the skin, and tend to produce an erythematous or eczematous rash (the so-called *eczema mercuriale*), the belt may require to be removed for a time, during which the ointment may be rubbed into some other part of the body.

Everyone is familiar with the cutaneous manifestations of infantile syphilis, but it does not seem to be generally known, at least there is no allusion to it in most dermatological works, that eruptions occurring after the infantile period in children and young persons are sometimes dependent upon hereditary syphilis. The diagnosis is often difficult, but the beneficial effects of a mercurial treatment sometimes serve to convert a suspicion of syphilitic taint into a certainty.—*Lancet*, June 18.

85.—ON THE USE OF CARBOLIC ACID IN A CASE OF SYPHILIS WITH SEVERE THROAT SYMPTOMS.

By Dr. C. SWABY SMITH, Seaforth, Liverpool.

In the month of July, 1869, a respectable married woman, about thirty-two years of age, was brought to me, suffering from great general debility, and from local soreness and irritation, the result of syphilis, contracted originally, a few years before, from her first husband. When first seen by me, the whole throat internally was in a shocking state, the disease involving all the parts included in the pharynx, isthmus faucium, and soft palate. The tonsils and uvula were destroyed, and the whole of the pharynx as far as the eye could reach above and below was one sloughing surface, which was constantly secreting a tenacious and most offensive pus-like matter. Not only the mucous membrane, but a great part of the muscular substance of the pharynx, had been destroyed, so that the whole aperture of the throat was much larger than it ought naturally to have been. The disease had also spread quite through the posterior nares, and there was a constant discharge from the nostrils. The urgent danger, however, arose from the terrible condition of the throat; for, owing to the excessive soreness and irritation, it was hardly possible for the patient to swallow food of any kind, whether liquid or solid. What she did manage to get down was mixed with the offensive matter from the discharging surface, which appeared to derange her

stomach, not to speak of the miserably unpleasant sensations involved in the process of eating or drinking. The woman had, in truth, taken very little in the way of food for several weeks, and almost nothing for some days before I first saw her. The emaciation was extreme, and the circulation exceedingly feeble. And it is not unreasonable to suppose that death would have taken place in a short time, either from exhaustion or hemorrhage. In fact, she had herself given up all hopes of life, having received little or no benefit from former treatment.

My first interview with the patient took place on July 2nd, 1869, on which day I applied, by means of a camel's-hair brush, Calvert's carbolic acid (made fluid according to the printed instructions, but not diluted in any degree) to the whole of the diseased surface, passing the brush upwards as far as the posterior nares, and downwards almost into the œsophagus, bringing away at the same time a large quantity of the offensive and tenacious secretion. On this same day she took, by my orders, a pint and a half of porter, half a pint of beef-tea, and an egg. She was also ordered to take five minims of liquor cinchonæ, five minims of Battley's solution of opium, and ten grains of iodide of potassium, in an ounce of water, three times a day.

July 3rd. Came again (being just able to walk from her own house, a few doors off) at 10 a.m. Can speak more distinctly; says her throat is much less sore, and can eat with far less pain. the throat was brushed out as before, but with a solution of of only 1 part of carbolic acid to 60 parts of water; this operation being repeated in the evening. Took during the day three-quarters of a pint of beef-tea, a pint and a half of porter, a pint of milk, and an egg. Medicine continued.

4th. The lotion (1 to 60) was again applied morning and evening. About the same quantity of food taken as on the 3rd. Medicine continued.

5th, 6th, 7th, 8th, and 9th. The same application in the morning and evening of each day, and about the same quantity of food taken each day. At the last date (the 9th) the patient felt a return of the natural relish for food, which had been quite wanting so far, and said she could eat nearly every half-hour, without pain and almost without discomfort. Medicine as before, three times a day.

The same topical application was continued twice a day until the 17th, when a solution was made of 1 part of Calvert's carbolic acid to 30 parts of glycerine, this lotion being then applied twice a day until the 3rd August, from which date until the 12th August the glycerine lotion was applied once every alternate day, then again on the 18th, and lastly on the 26th August.

A change in the medicine first ordered was made on the 14th July, but iodide of potassium was taken continuously until the

21st July, when it was discontinued, and syrup of iodide of iron substituted.

The patient left this neighbourhood about September 1st, wonderfully improved in health and general appearance. She had gained much flesh, could walk a good distance without sensible fatigue, slept well, and could eat almost anything that came in her way. My patient again called on me on the 1st of February in the present year, when her appearance was still more improved. In fact, she was in good condition, and had also become pregnant. The throat had filled up to about its normal size, and was covered with a perfectly healthy mucous membrane. It must be said, however, that she still suffered from a discharge from the nostrils, and also from one of the legs. She had been directed to pass frequently up each nostril a syringeful of carbolic acid lotion (1 to 60) until she felt it trickle out at the posterior nares. This she had done with regularity, and with some benefit; but there is obviously a vast difference between such a plan and the direct application of the lotion by means of a suitable brush. As the syphilis is of long standing, it is quite possible that the nasal bones may be involved in the destructive process. Of course the fact of the discharge from the nose and leg proves that the disease is not eradicated from the system. It is true to say, however, that the patient has, medically speaking, taken a new lease of life; for any member of the profession who had seen her in the first instance would scarcely have doubted that, unless prompt remedial measures had been adopted, death would soon have taken place.

The main point to which attention is wished to be drawn in the present case is the beneficial effect which was so rapidly produced by the direct application of the carbolic acid to the throat. The excessive soreness began to decrease after the first application. The secretion from the diseased surface, which was mopped away each time as much as possible, also regularly decreased in quantity, and became less offensive. After the first few days a new action was evidently set up, healthy granulations made their appearance, and the whole aperture of the throat, both above and below, was reduced in size. This was proved, as far as the upper part of the pharynx was concerned, by the fact that after a time the camel's-hair brush could with difficulty be pushed upwards so as to reach the posterior nares, though this was easily accomplished in the first instance. When the patient was last seen, the whole throat, as has been stated, had recovered its normal capacity, and was, with the exception of the lost parts, in a natural and healthy condition.

It is safe, therefore, to affirm that in this instance the topical application of carbolic acid to the extensively and almost hopelessly diseased throat of a syphilitic patient was of the most

essential service. It does not, of course, necessarily follow that the acid would be equally efficacious in all other cases of the same kind. Taking into account, however, the fact that the other strong acids have often been used as a local application to throats diseased from the same cause with little or no benefit, it is surely not too much to say that the result of the use of carbolic acid in this instance should lead the profession to make a fair trial of the same remedy in like cases.—*Lancet*, June 4.

86.—ON THE TREATMENT OF GONORRHOEA.

By FREDERIC C. SKEY, Esq., C.B., F.R.S.

In the treatment of gonorrhœa, we should always keep in mind the important fact that it has a natural period of subsidence, or cure, if untreated; that at the expiration of six to eight weeks it will die a natural death. Therefore, it cannot be a wise or judicious proceeding to commence the treatment by active purgation, or other form of depletion. I believe a mild aperient or two to be unobjectionable, and I have found benefit from a powder containing twenty grains of jalap and two drachms of powdered gum arabic, taken at night in half a tumbler of milk. This may be repeated for two or three nights, and then I think we should rest on our oars for a week or ten days, abstaining from active exercise, but adhering to the usual habits of diet, unless the daily consumption of wine or other alcoholic drinks is large; if so, I would reduce them partially both in quantity and potency. As early as the local pain and the profuse discharge are somewhat reduced, I advise you to resort to iron, quinine, or other tonics, and to increase the consumption of wine on the same tonic principle, commencing with a moderate dose, and increasing the quantity rapidly up to a full dose of the compound medicine. I generally prescribe ten or twelve grains of the citrate of quinine and iron twice daily. At the expiration of about a week from the commencement of the treatment by tonics, I would suggest a simple injection of one grain of sulphate of zinc to the ounce of water, to be used night and morning, and then thrice daily. It may be necessary towards the latter stage, if the progress is slow, to add ten minims of copaiba balsam twice daily. Beer is unobjectionable.

In cases of primary gleet the success of the tonic treatment above-mentioned is remarkable, as it will often, in mild cases, cut the disease short in three or four days; but in such examples there is an entire absence of painful micturition and chordee. If these symptoms are present, the tonic agents should not be resorted to until the expiration of a few days. If, unfortunately, orchitis should occur pending its existence, the treatment by tonics, most valuable in its absence, should not be resorted to.—*Lancet*, Sept. 24, 1870, p. 428.

MIDWIFERY, AND THE DISEASES OF WOMEN AND CHILDREN.

87.—HYPODERMIC INJECTION OF MORPHIA IN TEDIOUS LABOUR FROM RIGID OS UTERI.

By Dr. CHARLES W. SHAW.

Seeing, some short time ago, in an American Medical Journal, an account of the successful treatment of several cases of rigid os by means of morphia internally administered, and being favourably impressed with the arguments there used, I determined, if I should have an opportunity, to put its utility to the test.

The first case in which I saw an occasion for its profitable use was a *primipara*, æt. thirty, of sanguine temperament, who had been forty-eight hours in labour, membranes having ruptured some four days previously, and the os not larger than a florin, thin and indilatable. Having suffered so much, and being in a very nervous state, she was desirous of my remaining with her. I waited in the house for about six hours, and when the pains, although strong and frequent, were not producing the desired effect on the os, I determined to try the morphia treatment, more desirous of obtaining sleep for my patient than of hastening the labour. Having been called in unexpectedly to see this lady when I was out driving, and unprovided with any of the usual supplies, and being some six miles from any place where I could obtain a preparation of opium, I was rather nonplussed at first; but, fortunately, seeing some paregoric elixir, I gave her half an ounce, which, for twenty minutes or half an hour, appeared to produce no sensible effect, except diminishing the severity of the pains, though they continued as frequent and as long as before, till my patient called me, and said she thought the child was nearly born. I found the head pressing on the perineum, and in a few minutes delivery was accomplished—the placenta came away naturally, and everything went on favourably. The time from the administration of the paregoric till the conclusion of the labour was forty-five minutes.

On the 2nd July I was asked to visit another lady, æt. 23, also *primipara*, who had been in strong labour thirty-six hours. At the time of my visit—three o'clock—I found the head presenting,

and the os not larger than a shilling. I advised waiting, and left. Was sent for at 5 a.m. next morning, when I found every thing almost in *statu quo*, but my patient extremely exhausted. Having a syringe in my pocket, at 6 a.m. I injected 0·25 gr. of morphia, and had the pleasure of finding the os dilating rapidly, and labour completed favourably in about three hours from the time the morphia was used.

Again, on the 9th August, at 1 a.m., I was called to visit another case, æt. 35, who, although mother of three children, had not been pregnant for twelve years. She had been in labour for more than twenty-four hours; and, as all her previous confinements had been easy and rapid, she was considerably alarmed as to the result this time. Finding the membranes sound, with the pains moderate, and the os barely dilated, I left, seeing her in the course of the evening, when I found slight change. Next morning, at 6 a.m., I was sent for, membranes having ruptured from the violence of the pains; but the os not larger than half-a-crown. At this time she also complained of pain a little to the right of the umbilicus, where there seemed to be a thickening of the wall of the uterus. Partly to relieve the pain, which she complained of most bitterly, but chiefly to expedite matters, I injected 0·40 gr. of morphia, and in the course of two hours the child was born. The placenta was adherent just in the place where the hardness was perceptible after the escape of the liquor amnii.

I think the moderate use of any of the preparations of opium, either internally or hypodermically, would be productive of the happiest results in those cases where the rigidity of the os proceeds from an extreme amount of nervous irritability. — *Medical Press and Circular*, Aug. 24, 1870, p. 137.

88.—A CASE OF RUPTURED UTERUS SUCCESSFULLY TREATED.

By Dr. SCOTT, of Bagnalstown, Ireland.

On Thursday, the 28th of July, I was sent for to attend in her confinement a poor woman residing in the neighbourhood of this town. As I happened to be from home at the time, Mr. Borthistle, of the City of Dublin Hospital, who was on a visit at my home, kindly attended. On examining the case he found some symptoms of ruptured uterus, and knowing the woman to be in a dangerous condition, at once despatched a messenger for me. I arrived about four o'clock, p.m., bringing my midwifery instruments with me, and found the patient in bed. She was a thin, spare woman of about forty-five years of age, and the mother of five children. Her previous labours had

been natural and of short duration. She always enjoyed good health. Her pains, I was told, set in about six o'clock the evening before, after a row she had with a neighbouring woman, but they were not troublesome until six o'clock in the morning, when there was a good deal of flooding. The waters came away about ten o'clock, and for two hours the pains were very violent. The nurse in attendance stated that she expected the birth of the child every moment as the head was well down in the perineum. The patient was resting on her knees and elbows, and during a very violent pain, she suddenly found something break (own words), and she described the rupture as something like the bursting of a bladder, with a rush of water in the lower part of abdomen. Labour pains at once ceased, but a more distressing pain set in about the pit of her stomach, with great tenderness to the touch, and sickness with inclination to vomit. On examining the abdomen externally, I felt the limbs of the child through the thin walls, about two or three inches below the ensiform cartilage; and, on examining per vaginam, I found the head had receded about four inches, which helped to confirm the diagnosis Mr. B. had made, that there was an extensive rupture, and that the child had partly escaped. It was my duty to deliver her immediately, but from circumstances over which I had no control, did not attempt to operate until after eight o'clock—remaining with her all the time. Previous to operating, I gave a full dose of opium with brandy. I had very little trouble in getting on the forceps, but had a deal of pulling before I delivered her of a very large male child, who was, of course, dead. As there was no hemorrhage, I let the woman rest for about twenty minutes, then introduced my hand to take away placenta, which I found over the right ileum floating in fluid. On gently pulling the funis, it came away, followed by about a pint of dark grumous blood. While my hand was in the abdomen I could distinctly feel the uterus firmly contracted. After giving her some stimulants with laudanum, I attempted to put on the bandage, but the tenderness of which she all along complained was so great, that she would not allow me to tighten it on her.

My young friend Mr. B., suggested grain doses of opium, which I gave her every two hours, combined with two grains of the grey powder, and this she continued to take until the gums became quite tender; linseed poultices and stupes being kept applied to the abdomen. Immediately the gums were affected she began to get relief from the pain and tenderness. Her diet consisted of milk, chicken broth, &c., but no more stimulants were allowed, nor were they much indeed. What appeared strange there was no lochia, or other discharge, during recovery. The woman is now quite convalescent (August 29th),

and able to go about. The cause of the rupture I cannot say; there may have been some thinning at the seat of rupture, which could not resist the strong labour pains.—*Medical Press and Circular*, Sept. 28, 1870, p. 241.

89.—ON THE INFLUENCE EXERTED BY CHLORAL ON THE PAIN OF PARTURITION.

By E. LAMBERT, Esq., Paris, late House-Surgeon in the Maternity Hospital, Edinburgh.

As *the* hypnotic of this first stage, chloral stands as yet unrivalled; we have only to remember that opium, our only sure refuge, must be administered with the knowledge that we are conspiring, though for a higher end, against the course of labour.

It is with an earnest wish to further the progress of our art that I invite attention to the bare statement of the whole facts which have come under my observation. None more than yourselves will feel the interest that attaches to researches in this particular direction—none, I am sure, will be more anxious to employ the keen edge of criticism to the profit of experimental science.

Case 1.—Bridget M.T., aged 25, in her second pregnancy, was admitted to the Maternity Hospital at 8 a.m., 31st December, 1869. The os was fully dilated, the membranes entire, the head in first position, resting on the brim of the pelvis. The pains, carefully noted, were recurring about every five minutes from 8.50 a.m. to 10. Sir James Simpson, accompanied by Dr. Jenkins, U.S., and Dr. Coghill, attended at 10.15, and 3 i. was then administered. It was vomited six minutes after; and, at 10.28, 3 ij. were given in an enema; this was voided five minutes after. At 10.40 the patient had slight rigors, and from 10.45 to 11 there was marked somnolence in the intervals of pain. She then said she felt sleepy, but could not sleep, and this sensation passed away shortly. At 11.18 3 i. was again given and vomited immediately. This was followed by rigors and somnolence, as above, for the space of fifteen minutes. At 11.45 3 ij. were administered in an enema, but voided during the next pain. At 12.15 the membranes were ruptured artificially. From 12 to 1 the bowels were moved twice. The patient had constant eructations, and vomited twice. The labour terminated at 3.45; the pains remained throughout efficient.

Case 2.—Agnes P., aged 22. Primipara. Admitted to the Maternity Hospital at 6 p.m., 2nd January, 1870. At 7.30 the os was the size of a half-crown; the head, first position, was

entering the pelvis, the membranes entire. The pains were strong, at very regular intervals of five minutes. In the intervals of pain has constant slight rigors, which become much stronger during the pain. At 9.25 the membranes ruptured spontaneously, and at 9.30 the head was in the perinæum.

Sir James Simpson attended at 9.50; chloral 3 i. was then administered. 9.55. Says she feels the pains less. At 10, 3 i. again given; the rigors ceased, and the patient seemed to sleep in the interval of a pain. At 10.4, she is remarkably calm. At 10.9 there was a slight rigor, then a severe pain, and a sharp cry; and at 10.10 the head was born. Answered questions; said the pains were much less severe since she took the medicine, and that she slept in the intervals. 10.30. Sleeping very quietly, answered a question, and fell off again immediately. Removed placenta from vagina without any indications of consciousness on the part of the patient. 3.30. Woke and said, "Where am I?" Hearing her child cry, said, "Whose child is that?" Did not remember birth of child; took food, and slept soundly till morning. Questioned next morning, she affirmed that she only remembered looking up, and seeing three doctors; remembered taking the medicine and nothing more; knew nothing of the birth of the child.

Dr. Gordon accompanied Sir James Simpson. She made an excellent recovery. Her child had spina bifida. The case was reported to the Society by Dr. C. Bell. Chloral was administered to the infant, whose horrible cries were quieted by it; the spasms were also stopped by its influence.

Case 3.—Margaret O., aged 26. Primipara. Admitted to the Maternity Hospital at 5 p.m., 4th January, 1870. Had felt pains since 7 p.m., 3rd January. At 8 a.m., 4th January, saw a doctor, who told her she was in labour. Took train from Stirling, and was directed to Maternity, Edinburgh.

4th Jan., 5 p.m. Os size of a shilling, rigid. Membranes entire. Head, first position, entering pelvic cavity. Pains strong.

5th, 12 noon. No progress. Pains apparently very severe. Patient much excited during their recurrence, and very unruly. Moans constantly during intervals. Has refused food for twenty-four hours. Pains strong, but intermissions irregular, and pain never absent. Sir James Simpson attended at 12.45. Chloral 3 i. was given. 1.7. Marked somnolence during intervals of pain. 1.18. Quiet sleep during intervals. She always gets on her knees during the pains. These appear just as severe, but the intervals are at least two minutes longer, and very regular. She always re-assumes the supine posture before the pain is over, and falls asleep again immediately. 1.48. Says the pains are very sharp, and complains that medicine is doing no good.

Has much difficulty in getting on her knees. Her movements are unsteady. Eyes fixed, haggard; equilibrium uncertain. Ordered not to leave the supine posture. 2.35. Pains very very severe. Still regular. Moans during intervals. 2.48. Chloral 3i. 3.10. Perfect repose during intervals of pain. 4.30. Again becoming agitated and anxious. 5.30. Os dilated. 7. Dr. Walker ruptured membranes. 7.30. Chloral 3i. From 7.30 to 10, when the head was born, this last dose remained efficient. There was always quiet sleep during intervals, and the pains were not very sharp. At the exit of the head she showed no sign of greater pain. When all was over she said that the medicine had given her great relief, and pointed especially to the sleep she enjoyed in the intervals. Made same statement next morning.

Observation.—The marked effect in this case was to bring about perfect regularity in the recurrence of pains. These occurred at intervals sensibly longer, and I think it may be fairly stated that the patient was not fully conscious for more than two-thirds of the duration of the pain.

Case 4.—Mrs. C., aged 40, tenth pregnancy, 2, Campbell's Close, Canongate. 8th January, 1870. Attended case of Dr. Somerville's. Head at brim, first position. Os fully dilated. Pains rare and weak. Dr. Somerville reported that she was making no progress for some time back. 1.20 a.m. Gave ext. ergot. liq. 3i. 1.32. Head has entered cavity. 1.35. Gave chloral 3i. 1.40. Full, deep respiration, and perfect quietude. 1.45. Pain apparently less felt. 1.50. Strong pain. Head on perinæum. 1.55. Gave chloral 3i. 2. Sleeping. 2.8. It is not very evident that she is under the influence of the medicine. Pains follow close upon each other. 2.15. Head born, much apparent pain.

Observations.—There was a drunken husband, four children, and constant noise and talking. Impossible to obtain quiet, even long after child was born.

8th Jan., 1 p.m. Stated that she was conscious throughout. Felt very dizzy after second dose, and wished for sleep. Slept well the remainder of the night, and has done well.

Case 5.—Margaret M'D., aged 18, primipara, 7, Gullan's Close. In labour since 12 p.m., 12th January, 1870. Vomiting a good deal. 4 a.m. Found os dilated; membranes ruptured; head below brim. Pains regular—every three minutes. Rectum loaded. Enema. 6.30. Pains neither regular, nor of any duration. Patient very restless; gave chloral 3i. 6.40. Strong pain after quiet sleep. Complains little during pains, and is very quiet during intervals. 7.5. Head on perinæum. Gave chloral 3i. 7.10. Deep sleep. 7.40. Muttering. Is much agitated. Cannot be kept to any position. Slight delirium.

Mother got uneasy; said there was not fair play. Went out, and returned with a midwife. 8 a.m. By this time the patient was quite quiet. Got rid of the midwife. 8.20. Child born. Very little exhibition of pain. Cord over shoulder. Child born without much life. Was liberally *spanked*. Well recovered in three minutes. 8 p.m. Had slept till a little ago. Remembered nothing but "skelpin' the backside" (*sic*). Has done well.

Case 6.—Mrs. F., aged 34, eighth pregnancy, 6, Foulis Close. 13th January, 1870. Sent a nurse to the ease, and attended it at 10 p.m. Os size of a shilling. Pains very poor; not regular. 11 p.m. Hardly any progress. Patient has been living on oatmeal, and drinking a great deal of water. Has constant eructations. Ergot 3 i. produced instantly an emetic effect. A quantity of very sour-smelling fluid vomited, producing great relief. Pains not improved. 11.25. Ergot 3 i. retained. 11.35. Vomited a little. 11.50. Good dilatation. Pushed up anterior lip. 12.15. a.m. Birth of a female child. Another in utero. Membranes entire. Head presenting. 12.25. I now gave chloral 3 i., trusting to it to get over the second birth unknown to the patient. 12.45. No progress. Head still at brim. Ruptured membranes, and gave chloral 3 i. 12.52. Vomited, and continued to vomit frequently. 1.15. Head at outlet; forehead presenting. The patient was not delivered until 5 a.m. of a female child, dead. I applied forceps in presence of Dr. C. Bell, Dr. Walker giving chloroform. The patient was quieted for some time by chloral. She was sub-delirious for about half an hour. She slept a good deal.

Case 7.—Mrs. B., aged 19, primipara, 25, College Wynd. Menstruated 5th July, 1869. Married 9th July, 1869. Fell, going up stairs, 20th January, 1870. Woke with pains, 22nd January, 8 a.m. At 4 p.m., I found both feet presenting *sacro-posterior*. 4.30. Right foot near vulva. 4.40. Gave conjointly ergot 3 i., chloral 3 i. 5.10. Child born, with exomphalos size of half a large hen's egg; cord $1\frac{1}{2}$ inches broad. Child $6\frac{1}{2}$ months. Appeared dead; after twenty minutes of continued efforts it was resuscitated; it lived thirty hours.

Case 8.—Anne A., aged 27, second pregnancy, 14, Cowan's Close. At her first labour five years ago, twins, seventh month; had chloroform in the Infirmary, where she was under treatment.

7th February, 1870. Case of Mr. M'Swiney. I attended at 7 p.m. Breech *sacro-anterior*. She was a terribly unruly patient, and howled at the top of her voice during her pains, although they were not prolonged; she never ceased to ask for chloroform. At 8 p.m., the breech being well in the cavity, I gave conjointly ergot and chloral aa 3 i. At 8.4., a prolonged pain, with no exhibition of suffering. At 8.7, making a sort of

humming noise. For the next ten minutes she was in a very excited state, rolling her head from side to side on the pillow, throwing her arms to and fro in cadence, accompanying the motion with an extraordinary guttural noise; inspiration and expiration both sonorous, the first very short, the second very much prolonged; now and again a wild cry at the top of her voice during the pains. Within half an hour from the administration, she was herself, and continued her screams till the birth of the child at 9 p.m. Except whilst she was delirious, she continued to ask for chloroform. The child was at full time; the foetal heart was getting weak when I gave ergot. The labour was not hastened by it, and I could not find any trace of life when the child was born.

Case 9. — Janet B., primipara, Royal Maternity Hospital. Patient had been suffering for twelve hours, when I was called to see her at 4 a.m., 15th February, 1870. Os just admitting extremity of finger; thin, soft; membranes entire; pains regular and strong. 9 a.m., Pains are still strong, but recur at rather longer intervals ($\frac{1}{4}$ hour). No change in condition of os. 10 a.m. As above, patient very weary. 11 a.m. Chloral 3 ss., same dose repeated every half hour. 12 noon. A double dose. 12.30 p.m. A single dose. 12.45. A single dose, 3 iii. in all. Up to this time she had been conscious, even during the intervals of pain, getting off her bed during the pains, talking rationally, feeling sleepy, but unable to sleep. The pains recur every 7 minutes, are sometimes intercurrent, and of long duration. She was ordered to keep the bed during the pains; and when examined, the os was found still in the same condition. 12.55. Perfect repose; pulse soft, 88; respirations 18, very easy; pupils normal. She remained for half an hour asleep in a state of the most perfect repose. 1.30. Believing the anæsthesia to be sufficient, I asked Mr. Hinchliffe, who was present, to examine her; he found the os dilated to size of half-a-crown. and brought away some perfectly fluid blood. Dr. Keiller had first arrived, and he examined the patient. Unfortunately the first examination had disturbed the rest, and she was now agitated and complaining, rolling her head on the pillow, and asking for the nurse to support her back. She was, however, but partially conscious. By a singular concurrence of circumstances, a patient in labour with her fourth child was at the same time on the second bed of the Delivery Room, just completing the second stage of a painless labour. This and her former labour (3rd and 4th) had been without pain, and the contrast was painfully disadvantageous. 1.55. Chloral 3 ss. 2.10. Excited, talking much. 2.30. Quite and apparently unconscious, notwithstanding the disturbance attending the termination of the other labour, and the squalling of the child.

2.40. Again awake; eyes open naturally for the first time since nearly two hours. Asked her whether that child was hers. Said she thought she could not have got over it so easily. Asked her again whether it was her child. She felt her abdomen and said, No. I was unable to watch the case longer. The labour terminated at 8.30 p.m. Os remained as above till 5 p.m., when it began to dilate, and second stage was only one hour.

Case 10.—Jessie R., aged 24, second pregnancy, 19 Vennel. Had her first child at the Edinburgh Maternity, three years ago, under chloroform.

18th February, 1870. On the present occasion was in labour since 12 p.m. 4 p.m. Head low in cavity; membranes entire; pains frequent and strong. Ruptured the membranes. Patient very weary, very excitable, crying for chloroform. 4.10. Gave chloral 3 i., and told her it was the new way of giving chloroform. 4.20. Head was advancing, and anæsthesia not marked; gave chloral 3 i. She almost immediately ceased to manifest any excitement; remained quite quiet, and complained no more, not even when the head passed out at 4.40. Twenty-five minutes later, the placenta being still retained in utero, I introduced the hand, and found a portion of it grasped tightly at the left superior angle; withdrawing it, I failed to remove a portion of membranes, and re-introduced the hand, which had to contend with the same cause of retention. Patient perfectly unconscious. About forty minutes after the birth of the child, she began to speak from time to time, and soon opened her eyes. The noise of the child crying prevented her settling down to rest; but she was ignorant of the birth of the infant, and frequently asked "whether she was better—whether she would soon be better." She never inquired whether that child was hers. I had put the binder on over the naked abdomen, and she several times declared that somebody must have carried away her shift.

She now began to talk of her mother, who died last August, as if alive, and wondered when she would come. Now and then she slept for a minute or two, and then began again to rave; she talked rapidly, and often changed her subject. She said the doctor had tried to persuade her that was the new way of taking chloroform. "The doctor cheated me—I am sleeping, but I don't know myself—I wish I could sleep; I am very tired" (with her eyes shut). "I have tasted that stuff, I wonder what it was—I don't know, but it was not chloroform." Repeated often, "Am I better?" 5.25. Began to remember that her mother was dead, but on Dr. Niven coming in, asked when her mother would be back. Left her at 5.45. 8 p.m. Found her

asleep, and was told she had been talking a great deal of nonsense.

19th Feb., 10 a.m. Did not sleep well on account of a cough she had had some time past, otherwise quite well. Remembers the birth of the child—does not remember the removal of the after-birth. Says that the new chloroform is longer putting you over, but there is not the painful whirring sensation in the head.

Case 11.—Mrs. X., aged 23; primipara; in good health, but much troubled with nervous irritability during her pregnancy. Her dread of pain exceeds any powers of description. Her labour began just after midnight, 9th April. When she could no longer doubt that she was in labour, her excitement and irritability became great. Chloral was administered in 3 ss. doses every half-hour from 1.30 to 2.30 a.m. The effect was manifest by the time the second dose was taken, but it seemed desirable to continue the administration, in order to remove some remaining indications of restlessness. From this time, 2.30, to 8 a.m. the pains continued regular and strong; the patient quiet, and perfectly unconscious. An examination made at 6 a.m. showed the os fully dilated, and everything normal. The bladder was emptied with the catheter. At 8, contractions began to flag, and before 10 I wrote to Dr. Keiller, advising him of the state of the case. He was in attendance immediately, and examined the patient. Condition of perfect quiet; pupils rather large, but perfectly contractile. No signs of suffering on the part of mother or child. Dr. Keiller decided to wait. Labour made no advance. The head remained as above, in good position, but in the middle of the cavity. Towards 2 p.m. the patient became restless, and would not lie long in any position, rolled the head from side to side frequently; no speech. At 3 p.m., Dr. Keiller delivered with forceps a male child, which was with difficulty resuscitated, and which remained for twenty-four hours very weakly. Chloroform was administered at the last stage of labour, and its effect was, on the one hand, to quiet the restless agitation, and, on the other, to restore speech, and with this singular result, that the mental preoccupation, which one would have supposed effaced, was revealed as intense as ever; the few words she spoke having reference to her one extravagant preoccupation—her labour. The placenta was expelled naturally within ten minutes. She took food that evening, and slept soundly till next morning, feeling perfectly well, but *hurt*—so that here again her nervousness intervened to retard her recovery; for some slight pain about the parts, when attempting to pass water, alarmed her, and she maintained a voluntary paralysis of the bladder for three weeks, and was only cured of it by the

exercise of moral severity. The passage of the catheter left behind much irritation of the bladder. The convalescence was interrupted by an attack of fever—thirty-six hours' duration—on the twelfth day. She gave up nursing five weeks after her confinement; but improper management of the child, from the twelfth to the fifteenth day, must be considered the chief determining cause of this change.

Conclusions.—1. Chloral is an agent of great value in the relief of pain during parturition.

2. It may be administered under favourable circumstances during and at the close of the second stage, with the result of producing absolute unconsciousness in the same sense in which we understand unconsciousness under chloroform.

3. When thus given successfully, it has this advantage over chloroform, that it requires no interference with the patient.

4. It is desirable to retain chloroform in the position which it at present occupies in midwifery, and to reserve for the agency of chloral the first stage of labour. If, however, chloral or some agent having analogous properties is found successfully to relieve the pain of uterine contraction, the use of chloroform will be restricted to a lesser period of the duration of labour, or to the facilitation of manual or instrumental interference.

5. It is demonstrated that a labour can be conducted from its commencement to its termination, without any consciousness on the part of the patient, under the sole influence of chloral.

6. The exhibition of chloral in nowise interferes with the exhibition of chloroform.

7. The proper mode of exhibiting chloral is in fractional doses of grs. xv. every quarter of an hour until some effect is produced; and according to the nature of that effect the further administration is to be regulated. Some patients will require doses of 3 i.; and it is better to produce an anæsthetic effect by 3 iii. given in the space of two hours than by 3 i. given singly.

8. The effects of chloral are continued beyond the period of completed parturition, and the repose experienced by the patient after her labour is one of the favourable circumstances to be noted in considering its application to childbirth.

9. Any stimulating effects, in the form of general excitability, occasionally observed during the administration, have passed away very rapidly.

10. Chloral not only does not suspend, but rather promotes uterine contraction by suspending all reflex actions which tend to counteract the incitability of the centres of organic motion.

11. Labours under chloral will probably be found to be of shorter duration than when natural, for unconscious contrac-

tions appear to have more potent effects than those which are accompanied by sensation of pain.

12. Experiments are required in order to determine whether there exists the same antagonism between ergot and chloral as is known to exist between strychnia and chloral.

13. The general conditions under which chloral is to be administered are the same as those which regulate the administration of chloroform, and the rules laid down by Sir James Simpson in connexion with this subject must be rigidly adhered to.—*Edinburgh Medical Journal*, Aug. 1870, p. 114.

90.—CHLORAL HYDRATE IN LABOUR.

By J. GERSON DA CUNHA, Esq., Bombay.

[Of the numerous cases in which chloral is related to have been of service, perhaps none have interested us more than the three following.]

On July 15th, at 4 a.m., I attended Mrs. R., aged 20, a very slender and delicate-looking woman, pregnant with her second child at term. She was seized with labour pains on the previous morning, which returned at long intervals, and were inefficient. She felt much exhausted. Os dilated to the size of a half-crown piece. I ordered a dose of opium, and returned to see her at 10 a.m., at which time she was very restless. Seeing no benefit produced by the opium, I gave her half a drachm of chloral hydrate, to be repeated within two hours in case she could not obtain rest. Soon after taking the dose she fell into a profound sleep, and on awaking, about four hours after, the pains became more active, and she was delivered within ten minutes of a fine healthy child. Both mother and baby are doing well.

About a week after I was called upon to see Mrs. B., a Parsee lady, in her fourth pregnancy and third labour. Her previous accouchements were all tedious. Her age is 25. Had been in labour a day and a night. Pains lingering. Os dilated to the extent of a florin. From my former experience I gave her half a drachm of chloral, which procured a deep sleep. She awoke six hours afterwards, and within a quarter of an hour gave birth to a male child. She is in excellent health.

On August 1st, at 11 a.m., I was sent for to see N. J., aged 17, a primipara. She was hysterical; had been in labour thirty hours. Pains had made no progress; they recurred at intervals of thirty and forty minutes. She felt much fatigued, and was dispirited. Os dilated to the size of a florin. I lost no time in giving a dose of chloral. She slept for three hours, and on

awaking had two strong pains, which terminated her delivery. Placenta followed about ten minutes after.—*Lancet*, Sept. 24, 1870, p. 432.

91.—CHLORAL HYDRATE IN PUERPERAL CONVULSIONS.

By R. DACRE FOX, Esq., Resident Medical Officer,
Manchester New Workhouse.

[We do not remember to have met with any account of the use of chloral in puerperal convulsions, so that the following case is interesting.]

On May 28th, at 2 a.m., I was called by the midwife to see E. S., aged 15½ years, who had been in labour about eight hours, and had progressed satisfactorily till a few minutes before she called me, when, the head having begun to press well on the perineum, the girl went off into puerperal convulsions. When I saw her the fits were not very powerful, but frequent; she was quite sensible during the intervals. I ordered her at once some calomel, a strong mustard plaster to her neck, and a turpentine enema. I saw her again at 6 a.m.; the fits were now much more severe and frequent, she had no pains, and the head was not advanced. At 8 a.m. the fits were almost continuous; she was totally unconscious and very much exhausted. I then delivered her with the forceps of a dead and partly decomposed child. The fits from then till 12 p.m. increased in severity and frequency; her pupils were *dilated* and hardly acted at all. She had a feeble pulse of 100. I gave her half a drachm of chloral hydrate immediately, and ordered the dose to be repeated in two hours if the fits continued. I saw her again at two p.m. The nurse informed me that she had had only one fit since my last visit; her breathing was quiet, the pupils were normal and acting, reflex action had returned; she had a pulse of 108, still feeble; there was a very offensive discharge. I ordered her carbolic acid injection. At 8.15 p.m. her pulse was 120; she had no more fits, her breathing was quiet, the pupils were normal, and consciousness was returning. She knew the midwife, and complained of pain. At 11 p.m. her pulse was a little less frequent; she was in a fitful sleep, tossing about the bed a good deal and with occasional twitching. I ordered her the second half drachm of chloral hydrate.

May 21st. 9 a.m.: She had a quiet sleep for six hours after taking the draught, but then became restless, &c., as on my previous visit. Pulse 120; conscious, and no particular pain. I ordered her to take ten grains of chloral hydrate every four hours, in a mixture, with small doses of digitalis, hyoscyamus, and bicarbonate of potash. 6 p.m.: Pulse 120; had slept well,

was quite sensible, had taken pretty well of beef-tea and milk.

22nd. Pulse 120; complained of great pain in her head; hot dry skin, loaded tongue; quite sensible, but nervous and excited, and still taking milk and beef-tea. I ordered her to take half an ounce of castor-oil at once, and saline mixture every four hours.

23rd. Pulse 110; had a good night; skin still hot and dry, tongue cleaning, pain in the head much less, still restless and excited; fancies her child is in bed with her; pupils dilated; no pain.

24th. Pulse 120. She seemed a little excited at my visit. Had slept well; slight pain in her head, bowels regular, lochia natural, tongue cleaning, skin moist, delusions gone; taking her milk and beef-tea. Ordered two eggs daily.

25th and 26th. Still improving. Her pulse has gone down; she is very weak; secretions normal.

From this time the patient has been doing well, and is now fairly convalescent. There is no family or previous history of epilepsy.—*Lancet*, July 16, 1870, p. 101.

92.—PUERPERAL MANIA CURED BY CHLORAL.

By Dr. HEAD.

[The following case occurred at the London Hospital under the care of Dr. Head. The patient was 29 years of age, and the labour, which was her fourth, was quick and easy. The first commencement of the mania arose from mental irritation.]

When seen at 3 p.m.. she was in a very restless state. When anyone approached her, she would clutch hold of them by the arms, but made no attempt to injure. She followed with her eyes those in the room; and when anything was said in her presence she repeated it. For instance, Dr. Palfrey, who happened to be present, said, "I should give her chloral and support"; and she repeated, "I should give her chloral and port." She talked a good deal, also, of her children, especially "Bobby."

One drachm of chloral hydrate was given in a saccharine solution, with twenty drops of tincture of ginger to disguise the flavour; and I may here remark that this forms a vehicle which is least objected to by patients. Five minutes after taking the chloral she was fast asleep. She awoke about 6 p.m.; was just in the same condition as she was previous to taking the medicine; and so another drachm of chloral was given, when she at once went off to sleep again. She then slept, with only one interruption, when brandy was given her, going off again until 6 p.m. on the 22nd (twenty-four hours). When

seen at 8 p.m. on this day she was perfectly rational. She said she was very thirsty; that she had a troublesome cough; and that her tongue was very sore. On looking at her tongue, its surface was clean, but there was a large abraded patch on the left side, as though she had bitten it. Her temperature was 102·4; pulse 120; respiration 30. Her breasts were large; so equal parts of extract of belladonna and glycerine were ordered to be applied; pil. col. co., gr. x, to be taken at once; and, the last thing at night, thirty grains of chloral. She slept all night. In the morning, May 23rd, she felt much better, was without headache, and the bowels had acted several times. Pulse 96; respirations 21; temperature 99·4. She was perfectly sensible, and complained only of her tongue. From this time she had no bad symptoms. By the evening of the 25th, her pulse was 72; respirations 18; temperature 98·4. She had, as a sleeping draught, on the evening of the 23rd and 24th, thirty grains of chloral; and, on the 25th, slept perfectly well without anything. On the 28th, she had seen her husband and other friends, and behaved quite naturally with them. She slept well each night; her appetite was good; the tongue healed; and she wanted to get up.—*British Medical Journal*, June 11, 1870, p. 602.

93.—THE TREATMENT OF PHLEGMASIA DOLENS WITH OPIUM.

By Dr. C. C. P. CLARK, Oswego, New York.

[Phlegmasia dolens rarely involves any danger to life, but it is a disease which is attended by so much present suffering, and so much future ill-health, that it deserves more careful study than is usually given to it in medical works.]

For the last fifteen years I have treated this disease with a single remedy: that remedy is opium. Opium cures phlegmasia dolens with more certainty than quinine cures a tertian ague. I speak from the experience of more than a score of cases. The results have been uniform. The remedy does not simply make the patient comfortable: it cures the disease, if any remedy cures any disease. I never hesitate to assure a patient attacked with phlegmasia dolens that her sickness shall be short and painless, and shall not be followed by that disablement that the experience of some neighbour has taught her to fear.

The rule for the administration of the drug is simple: Let the pain be kept thoroughly subdued. It is not too late for the beneficial effect of the medicine so long as the disease is painful, but the sooner the treatment is begun the more complete is its remedial influence. In view of this fact, the first

symptom of the disease should receive attention. That symptom is, I think, always pain in the lower part of the pelvis on one side. It may be near the groin, or the back, or the hip-joint, or it may be deeply and obscurely seated. It is generally not severe at first, but it is always accompanied by a certain hardness of the pulse that the *tactus eruditus* easily detects. But whether or not this preliminary pain be noticed, whether the suffering be extreme or moderate, whether the disease be accompanied by much or little fever, whatever the state of the bowels, of the secretions, or of the excretions, the rule of treatment is the same: the pain must be met by opiates, which should be carried to the point of procuring absolute relief therefrom; and their use should be continued till it can be omitted without the recurrence of suffering.

That this remedy does not simply relieve pain, but also actually arrests the morbid process, will be obvious to any one who compares the course and duration of a case treated by it to the progress of one submitted to all or any part of the multifarious treatment that is laid down in the books. It will be still more obvious in the results of the disease; for, in a case early and thoroughly treated by opium, the femoral and other veins will be found after the sickness to be free from those fibrinous clots that under other treatment seal them up for ever. Even in cases where the morbid process has become mature and extensive before opium has been resorted to, the disease will not only be arrested by it, but the evil work already done will generally be undone. Existing fibrinous deposits will soften and dissolve into the current of the blood, and the affected veins will be left pervious. I know, as a matter of repeated and careful observation, that the signs of venous obstruction rarely or never show themselves in any considerable degree after a case of phlegmasia dolens that has been vigorously handled by opium.

The control of opium over active fibrinous inflammation of the veins is not confined to this seat of that disease. I have seen repeated instances of its power in those accidental cases of inflammation of the veins which intervene in the course of other diseases. I do not see in this any specific or peculiar power. I believe it is the same control which we see more or less evinced by opium over all the fibrinous inflammations. We all know the great influence that it displays, especially if used early, in peritonitis and pleuritis. It is not strange that it should check also an inflammation of the veins. On the contrary, the seat and the other conditions of that inflammation are especially favourable to the influence and permission of the free use of opium. I may add that the parturient condition, anæmic, irritable, and exhausted, is especially suited to the beneficial effects of this drug.

I by no means claim originality in the use of this remedy in this disease. Most practitioners, I am well aware, resort to it for relieving pain and for procuring rest, and many of them, I have no doubt, place on it their main reliance. But I go farther than even these last: I use opium and nothing else, and I make my patients comfortable and give them a quiet and complete cure.—*Medical Record*, June 1, 1870, p. 155.

94.—NEW METHOD OF SECURING THE PEDICLE WITH SILVER WIRE, IN OVARIOTOMY.

By Dr. THOMAS ADDIS EMMET, of New York.

The proper treatment of the pedicle after the removal of an ovarian tumour still remains a mooted question. Dr. Thomas Addis Emmet states (*Am. Journ. Obstetrics*, Feb. 1870), that the various means proposed are all applicable to certain conditions of the pedicle, but no single method has yet been accepted as combining the advantages of each in common, and applicable to all cases. His preference has been "in favour of returning the stump whenever it was practicable to do so, and of closing the abdominal section. The silk ligature, in its ready application, presented many advantages over the silver wire, but I have used chiefly the metallic suture in preference, regarding its use as attended with less risk afterwards. The method, as practised by Dr. Sims, of securing the pedicle by means of a series of interrupted silver sutures, I have used several times, and considered it a great advance. I found, however, that without the pedicle was a thin one, troublesome oozing of blood frequently occurred from the tissues becoming lacerated in the tract of the sutures, as a consequence of the tension exerted in an opposite direction, as each loop in turn was twisted.

"October 18th, 1869, at the Woman's Hospital, I removed, from a patient thirty-three years of age, a multilocular ovarian tumour, weighing forty-five pounds, which had been of some two years' standing. As a large portion was nearly solid, the section had to be extended for several inches above the umbilicus before the mass could be removed. Chronic peritonitis had existed, but the adhesions were slight, except at one point, to the omentum. The left ovary was found involved with a long and rather thin pedicle.

"My friend Dr. Sims kindly introduced the sutures for me by his method, but unfortunately some oozing took place from the splitting of the tissues, as has been my previous experience; but after some delay it was controlled by the introduction of a parallel row of interrupted sutures, so as to secure the angles of the lacerations. This patient, however, rapidly recovered,

and was discharged cured, November the 29th. Realizing that this difficulty must frequently occur when the pedicle was thin and small, I resorted to a different method of applying the wire, as illustrated in the following case:—

“Mrs. S., aged 28, a native of New York, was admitted to the Woman’s Hospital, November 25th, 1869. She had married at fifteen, and was the mother of four children. The first child was born two years and four months after marriage, and the last two years and eight months previous to admission. She had been in good health until the latter part of December, 1868, when the abdomen began to enlarge rapidly, with frequent and painful micturition, while she suffered at the same time from constant pain in the back and left inguinal region. The enlargement was so rapid, that at the end of two weeks after it was first noticed she was unable to wear any of her clothing which had previously fitted her, her appetite began to fail, and she soon became emaciated. Before the end of February, the tumour had enlarged nearly, as she stated, to the size presented at the time of admission. The catamenia, which appeared first at the age of fifteen, and had always been regular previous to this time, became now irregular, and of short duration, until it ceased in the following May. Just previous to admission she had arrived from New Mexico. She was much emaciated, with œdema of the lower extremities, but cheerful, and very hopeful of a favourable result from surgical interference. A large multilocular ovarian tumour filled the abdomen, extending up to the sternum, and causing the false ribs to bulge outward to a great extent. The circumference of the abdomen, on a level with the umbilicus, was fifty-two and a quarter inches. The distance from the ensiform cartilage to the umbilicus was thirteen and a half inches, and to the pubis twenty-five inches. From the left anterior superior spinal process to the umbilicus was fifteen and a quarter inches, and on the right side fifteen inches. The mobility of the tumour was but partial. Œdema of the abdominal wall, with much thickening of the tissues, existed from the pubis nearly to the umbilicus. The linea alba was well marked, with an unusual number of superficial dilated veins distributed over the abdominal surface. The whole abdomen was dull on percussion, with fluctuation easily detected at every point, yet varying greatly in distinctness. The uterus was high up in the pelvis, somewhat forward, but moveable, and its cavity of a normal depth. Urine normal, as were also the heart and lungs; the pulse weak—98. Tongue clean, bowels regular as a habit, but the skin dry and inactive.

“Her condition from the distension rendered an early operation imperative, and in fact the lesser evil, although much enfeebled after so long a journey, and unacclimated. The

preparatory treatment was completed in a week, and consisted of a Turkish bath every other day, with five grains of inspissated ox-gall in the form of a pill, three times a day. On the third day a dose of castor oil was administered; and on the night previous to the operation a large enema of hot water, into which a portion of ox-gall had been dissolved, was thrown into the rectum, while the patient was placed on the knees and elbows. Her diet had been carefully regulated to be as nutritious as possible, in a small bulk, and consisted chiefly of strong beef-tea. Her condition improved soon in a marked degree. The œdema of the extremities was removed by rest and bandaging, and she no longer suffered from the great distension after the thorough cleaning out of the bowels, while her skin, from the use of Turkish baths, had become soft, and in excellent condition."

On the 1st of December, 1869, Dr. Emmet performed the following operation in the presence of a number of gentlemen: "An incision of some six inches was made midway between the umbilicus and pubis through the linea alba, which was very distinct in consequence of œdema of the surrounding tissues. On reaching the peritoneum it was found firmly adherent to the tumour in every direction. The main cyst, together with several others, was emptied through a common opening. By degrees the adhesions were carefully stripped off from the surface of the tumour itself, using chiefly the finger nails for the purpose. The adhesions extended from about four inches above the pubis to the diaphragm, and from five to eight inches on either side of the median line. To facilitate their separation it was necessary to extend with scissors the abdominal section upward and to the left of the umbilicus, until it reached fourteen inches in length. Although the hand was introduced into the main sac, and an attempt made to break down into it the numerous small cysts, it was found impossible to empty but a small portion of them, and with difficulty the mass was finally removed through the extended abdominal opening. The tumour was from the left of the uterus, with a thick pedicle three inches in width. The right ovary and uterus were in a healthy condition. The ether was administered by Dr. Perry, and the case required the most careful watching, as several times during the operation the shock was so great that stimulants had to be resorted to. The tumour was removed at the end of an hour and a quarter. As the mass was held up, a clamp taken from one of Chapman's ice-bags was placed on the pedicle as close to the tumour as possible, when it was severed by scissors. A section of stout silver wire (No. 25) had been prepared about eighteen inches in length, to each end of which a common coarse sewing-needle had been soldered,

after bending a portion of the wire into each eye. In the grasp of the clamp the pedicle had been spread out to its full width, and, as it was held up, the ligature was introduced in the following manner: Below the clamp a needle was passed through the pedicle about an inch from its edge, but before its withdrawal the needle in the other hand was inserted along its course from the opposite direction. The two needles were thus drawn through, in the same manner as the shoemaker's stitch, and at the same time the wire was tightened around the included section as much as could be done, in consequence of the proximity of the clamp. The needles were introduced again in the same manner, so as to divide the pedicle into three sections. With the ends of the wire in one hand, the pedicle was seized between the grasp of the thumb and forefinger of the other hand, and at the instant of removing the clamp, by traction on the wire, the parts were drawn up tight together in two sections, while all bleeding from the third one was controlled by pressure of the thumb until the ends of the wire could be twisted. The ends of the wire were seized about an inch from the pedicle in the grasp of a pair of forceps, and carefully twisted over Sims's shield, to a point at which the integrity of the wire was still unimpaired. The twisted portion was cut off at half an inch in length, and bent over flat along the course of the ligature, so that the end was perfectly protected at the bottom of a deep sulcus. The ligature was applied in far less time than the clamp could have been adjusted, with perfect control of all bleeding, and to a pedicle which, from its size, would have been difficult of management in any other manner. So perfect was the compression, as the wire was tightened the tissues retracted from the blood-vessels, so that they projected a quarter of an inch beyond the plane of the divided surface which had been in common.

“Although the adhesions had been stripped off so extended a surface, no oozing of blood took place afterwards, except high up in the vicinity of the spleen, where the adhesions could not be separated from the tumour with the same care, in consequence of the difficulty in bringing the parts fully in view. To the bleeding points the fluid extract of ergot was applied, but it proved valueless as a styptic, and afterwards the persulphate of iron was brushed over the surfaces, but in small quantities, to avoid the formation of an insoluble clot.

“The external wound was closed by fifteen interrupted silver sutures, and were introduced far back from the edges, so as to include the peritoneum. As the oozing had not entirely ceased, high up on the left side a quantity of cotton was formed into a compress, so as to press the relaxed abdominal wall, at that point, well up under the ribs; this pressure, it being thought,

would be sufficient to control all bleeding. Over the whole a broad bandage was applied, and she was placed in bed, with artificial heat around her. Immediately before the operation she was weighed on a platform scales, and her weight, with that of her clothing and the table, ascertained. She was placed on the scales after the operation, and it was found that she had lost sixty-nine pounds. The accuracy of this method was tested by carefully weighing the fluid and the mass taken away, with a difference of less than two pounds which had doubtless been lost in the sponging. Immediately after the operation her pulse was 120 and very feeble, but reaction came on promptly. At 10 p.m., as she was restless and complaining of pain in the back, a teaspoonful of Mc'Munn's elixir of opium was given by the rectum, and she passed a comfortable night. The sutures were removed December 7th, and the union was found complete. December 9th. To this date her convalescence had been slow, but without any interruption. Small circumscribed abscesses now formed at the entrance and exit of the abdominal sutures. Their formation was evidently due to the diminished vitality of the tissues consequent upon the œdema and distension to which the parts had been subjected by the enormous size of the tumour. December 10th. Pulse 108. Up to this time no alcoholic stimulants had been found necessary, but were now ordered. During the night of December 12th, was seized with severe cramps involving the muscles of the inner part of the thigh, and afterwards in the calf of the left leg and foot. Large doses of opium were found necessary to relieve her suffering. Next morning the leg to the ankle was swollen from œdema, with an increased temperature of the parts. The limb was carefully bandaged, and in twenty-four hours she was entirely relieved. She began to recover rapidly, and in ten days the abscesses had healed. January 7th, 1870, she was discharged, having fully recovered.—*American Journal of Med. Sciences*, April, 1870, p. 578.

95.—CASES ILLUSTRATING THE USE OF THE LAMINARIA DIGITATA TENTS.

By Dr. JOHN A. BYRNE, Professor of Midwifery to the Catholic University of Ireland.

[In the first of the two following cases it was necessary to dilate the os for the removal of intra-uterine polypus; in the second on account of the retention of a piece of ovum after abortion. Dr. Byrne considers that there are the following objections to sponge tents for dilatation, viz., difficulty of

introduction, tendency to slip out, and liability to become foetid and offensive.]

Mrs. M., aged 21, consulted me on 12th October, 1869, for uterine hemorrhage, which had continued some time. Her statement was to the following effect:—She had been married about two years, had one child in April, 1869; when she was three months nursing this child she became pregnant, aborted at three months, had a good deal of hemorrhage; after this she again became pregnant, again aborted at three months, or thereabouts, and since that time has been in very delicate health, having been scarcely ever free from hemorrhage. When she came to consult me she was very anemic and feeble from the frequent attacks. She was a healthy-looking woman in every respect, and with this exception had been always so. Before marriage she had suffered from dysmenorrhœa.

On my examining her with the speculum there was no appearance of anything which could account for this—the os uteri was healthy; on examining, however, with the finger, the cervix uteri felt rigid, the os uteri was closed, and I detected an enlargement and hardness of the uterus at the junction of the body with the cervix; the os itself was so contracted that it scarcely admitted the point of the sound, and I could not introduce it for even the smallest distance without causing considerable pain, so that I was obliged to desist. She was very hysterical, and I could not arrive at any conclusion derived from this source of examination. I told her my opinion was that there was a tumour seated within the uterus, and that it was most probably the cause of the hemorrhage, although it would be impossible then to form an opinion as to its curability. I ordered her cold lotions and ferruginous preparations; and as she then absolutely declined any more interference, I said I could not be of much service to her.

On the 14th inst., just two days from her first visit to me, I was hastily summoned to see her in the evening. She had been suddenly attacked that morning with flooding and had lost an alarming quantity of blood. She had tried the usual remedies—cold, vinegar, &c., but they all failed. When I saw her she was really almost moribund, her pulse was scarcely perceptible, her lips were pallid, and on looking at the bed I perceived that several large clots were lying in napkins. She was so ill that I was obliged to use the tampon—give brandy freely, gallic acid—and I thus succeeded in checking it for some days. When the tampon would be removed, it would cease for a few days, again return, and several times she was nearly moribund from the great losses which she sustained. After two or three days' cessation of the hemorrhage, she would again acquire

strength, her lips would regain their colour, and she, thinking that it would no more return, would get up, move about, and then, after a short interval of freedom from bleeding, she would rapidly lose a large quantity, expelling it partly in coagula, partly fluid; treatment would arrest it for a time, but it would return. Thus from the 14th to the 30th October matters passed. I wished to explore the uterus; explained my views to her friends and husband; but I could not induce them to consent to any operation for the purpose of effecting a permanent cure. In this state of things I told them to obtain other advice, as I would no longer be responsible, and I did not see her for several days, when on the 24th of November I received a note from her husband, stating that that she would consent to anything which I proposed. I asked my friend, Dr. G. Kidd, who had seen her for me during an unavoidable absence on two days, and who entertained the same view of the case as I did, to assist me. On the 25th of November he proceeded to explore the uterus. The first thing necessary was to place her under the influence of chloroform, which was carried out effectually by Dr. Kidd for me, as it was utterly impossible to do anything to relieve her otherwise, she was so nervous and unmanageable. This having been effected, I introduced a duck-bill speculum into the vagina, and seizing the anterior lip of the os uteri with a strong vulsellum, so as to fix it, the sound was passed up through the narrow and constricted cervix. In doing so there was some difficulty, which was caused by the tumour; but this difficulty having been overcome, a piece of the laminaria, about four inches in length, was passed through the os, and into the cervix; another was passed alongside this, and so on, until five of them were passed. Dr. Kidd suggested this plan, instead of using those which are sold for the purpose and prepared, on account of the latter being too short; and as our object was not only to dilate the os and cervix uteri, but also the body of the uterus, I fully concurred with him. Having introduced them nearly the entire length, I passed a small plug of cotton wadding into the vagina, and the first part of the operation was finished.

In a few hours she began to complain of pain over the uterine region, but this was relieved by a suppository of morphia introduced into the rectum.

She slept well on that night, and Dr. Kidd and I met again the following morning.

She was placed in the usual position, and the plug and tents removed.

The os and cervix uteri were so much dilated by the process adopted, that I could easily introduce the index and middle finger of my left hand. On doing so I felt a soft tumour of

about the size of a grape, attached to the anterior and lateral wall of the uterus, near the cervix, and corresponding exactly to the tumour felt on examination previously; it was not pedunculated, but sessile, and very soft and pliable. Dr. Kidd also examined it, and satisfied himself of its nature. Intending to pass a loop of wire around it, and extract it with the ecraseur, I grasped it with a vulsellum, but it was so soft and pliable that it came away, and I was obliged to tear it out in fragments; any portion which I could not grasp I scraped with my nails, and having taken it all away, the interior of the uterus, where it was attached, was touched with strong nitric acid.

She recovered without a single bad symptom. For two or three days there was a dark-coloured discharge, which appeared due to the contact of the acid.

She was well in a few days. She rapidly regained strength. She had no return of the hemorrhage, and she menstruated regularly until February, when she again became pregnant, and she never has had the slightest annoyance since.

Dr. Hayden's Report.—"Shreddy portion consists entirely of fibro-plastic structure, *i.e.*, fibre-cells drawn out at extremities into fine filaments with large oval nuclei in central portion. Under strong acetic acid the filamentous portion disappeared in some measure; a few red blood corpuscles were likewise visible. The soft pulpy portion consisted of mucous exudation entangled in the foregoing structure."

On looking at those small broken pieces, which once formed a single mass, it could scarcely be believed that so small a substance could give rise to such alarming symptoms as those just detailed; but those who are conversant with such matters are aware that hemorrhage of the most alarming nature is a frequent attendant upon polypi, whether seated within the uterus or external to the os. I have myself seen very severe hemorrhage to arise from the small vascular polypus, scarcely the size of a small pea, which is occasionally seen to be seated just at the orifice of the os uteri, and we know very well the fearful flooding which proceeds from the ordinary pedunculated extra-uterine polypus. I have not the slightest doubt in my mind that this lady would have died in some attack of flooding, or else that she would have gradually become exhausted from the frequent attacks, were it not that we were fortunately able, by exploration of the os and uterus, to ascertain the origin and source of it, and thus remove the cause; and this could not possibly have been effected without the aid of some substance such as the *laminaria digitata*, whose properties of expansion are so wonderful, and, at the same time, so innocuous.

The second case in which I had an opportunity of testing its efficacy was the following:—

On November 13, 1869, at 2 a.m., I was hastily summoned to see a lady residing at Waterloo-road. When I reached the place, I found the lady in a most piteous condition, the entire bed was saturated with blood, napkins, and everything which could be obtained were full of it; large coagula lay scattered about, and she herself was pulseless—cold—in a state almost of syncope, and, in fact, almost moribund.

Having administered stimulants, and stopped the hemorrhage, I inquired her history. It was this:—She had been some years married; was 32 years of age; had three children, the eldest of whom, a boy, about six, was with her; she had been under treatment in Dublin for some time previously, she told me for uterine complaint, and, according to her statement, had on one occasion a small polypus removed, which had given rise to considerable hemorrhage. Since then she had aborted twice. She recovered very well after her last miscarriage, which took place about three months before; and she was going about in her usual manner. At the next menstrual period she thought that it was more abundant than usual. Soon afterwards she began to notice that she had a discharge every fortnight, then every week, and then every second or third day; rest and cold would stop this, but surely it would come on again. She began to be alarmed, and had come up from the country that day with the intention of consulting me on the following day. She was a very healthy looking woman; very large, and well formed; of florid complexion, and very strong-minded. She had been so frequently under the care of some of our best metropolitan gynecologists, that she was quite conversant with the names of all the instruments used by us.

The sudden and nearly fatal hemorrhage precipitated her intention of sending for me, and I found her in the condition which I have attempted to depict.

On examination, when she had sufficiently recovered, I found the vagina filled with coagula; but I could detect no cause for such severe hemorrhage. It was metrorrhagia evidently depending upon some internal cause. I applied a large pledget of cotton, steeped in a saturated solution of perchloride of iron, to the os—having syringed her with cold water—then plugged the vagina, administered stimulants freely, and gallic acid and ergot. Next day she was improved; there was no return, and so matters went on for a few days. I examined very carefully; there was no ulceration of any kind—simple or malignant; there was not the slightest abrasion even. I examined her with the sound; it afforded no positive information; the uterus was normal in size and position.

She soon recovered from the effects of the hemorrhage, and regained strength; but in a few days she was again attacked, and lost a considerable quantity of blood. I determined now to explore the os uteri; and, with this intention, I introduced a piece of seatangle of large size, and left it in for 24 hours. It produced no inconvenience. On the next day, when I removed it, and passed my finger into the cervix, I found a small piece of something tipping against my finger, which, on removing my finger, fell out into the vagina. I need scarcely say that there was no return of the hemorrhage. In a few days she was quite restored to health; and was delighted to get rid of her annoyance, which she examined herself.

On examination of the substance expelled, it proved to be a piece of the foetal membranes, consisting of thickened chorion and amnion, which latter was quite evident from its white glistening appearance, and which had remained from the previous conception and abortion. The lady has returned to the country, and I believe, but of this I am not certain, that pregnancy has taken place.—*Dublin Quarterly Journal*, Aug. 1870, p. 105.

96.—ON THE DIFFICULTIES OCCASIONALLY MET WITH IN THE INTRODUCTION AND REMOVAL OF TENTS.

By Dr. LAUCHLAN AITKEN, Edinburgh.

Whether the tent we intend to use be of sponge or seatangle, it is decidedly preferable to commence by expanding the vagina to some extent by a speculum, and for this purpose no better instrument can be found than that of Dr. Marion Sims. In the introduction of the sea-tangle it is by no means so absolutely necessary to use the speculum as in the case of the sponge tents; as the latter, however well prepared, so rapidly imbibe the fluids of the vagina, if allowed to come in contact with them, that they become soft and flexible, and consequently useless, before they can be introduced into the os uteri, and the employment of the ordinary form of Sims's speculum necessarily entails the presence of a third person, which is occasionally very strongly objected to. The use of any of the varieties of bivalve specula prevents us, of course, from grasping and drawing forward the anterior lip of the os with the tenaculum, and thus frustrates one of the principal purposes for which the speculum is required at all. For the introduction of the tents, too, we require to be provided with different instruments. For the sponge and hollow tangle tents, I generally employ the form of bent stilette, long ago recommended by Sir James Simpson; while the solid laminaria tent is more firmly grasped and more easily manipulated by a long-handled and roughly-serrated modification of the polypus forceps.

Having thus settled the preliminaries, it is by no means difficult, in the great majority of cases, to slip the tent into the os and cervix, but occasionally it happens that you meet with some obstacle to this easy entrance. The most common impediment usually arises from the catching of the point of the tent in one of the folds of the cervical mucous membrane. But this only requires to be mentioned to suggest its own remedy. Much more difficulty, however, is experienced in overcoming the real stricture which often exists at the os internum. It ought never to be forgotten that the internal or cervico-uterine orifice is the narrowest point of the canal, and that it is here that the point of the sound is most commonly arrested. In selecting the size of tent to be first used, we ought consequently to be guided by the information which a previous use of the probe has given us of the state of this orifice. In some few cases it will be found impossible to pass a tent, and then the only rational treatment is to dilate the stricture by the pressure of metallic bougies of gradually-increased diameter. I have seen two such cases in which this was the only feasible treatment. In one of them the strictured internal orifice had apparently been produced by a protracted labour; in the other, it was due to the existence of a fibrous tumour low down in the interior wall. The treatment would, of course, be similar if the stricture were at any other part of the cervix except the external os. Of spasmodic stricture of the os internum, which is mentioned as a common occurrence, after the use of the sound, by almost all gynækologists, I know nothing from personal experience. We are bound to believe that it occurs, as the weight of authority seems in favour of the statement, but I cannot think that it is so frequent an event as is supposed. Its treatment, if it form an impediment to the introduction of the tent, is obviously to chloroform your patient.

Of all the impediments to the entrance of the tent, however, the most annoying, and probably the most common, is the result of a flexion of the body of the womb on its cervix. The internal orifice, at or near which the flexion almost invariably occurs, is thus most effectually strictured, and the position of the womb is such that it is next to impossible to introduce a straight tent. I ought here to remark, that if the flexion has been produced by adhesions of the uterus to the surrounding parts from bygone inflammatory action, a tent ought never to be used. At least, I know of scarcely any circumstances which would justify the dilatation of the cervix and body of the womb under the imminent risk of a renewal of the peritonitis. To get over the difficulty, I at first thought of employing tents bent to some extent in the same direction as the axis of the flexed uterus, but this was proved by trial to be much better in theory

than in practice, as at the angle of flexion of the uterus the tent invariably became deeply indented, and thus merely enlarged the cervical and uterine cavities, leaving a strictured part between. I now find that the only real escape from this difficulty is to employ a probe to replace the uterus as nearly as possible in its normal direction, and then to slip in the tent by the side of the metallic director.

In extracting the tent, the only common source of difficulty arises from its occasional unequal dilatation. It sometimes happens that the existence of a stricture of the cervix, whether it be at the internal os or any other part, may produce such an indentation of the tent as to give it an hour-glass form. When this rather awkward result ensues, we ought never to use any great force in our efforts at removing the tent. Grasping the lower end firmly with a three-toothed vulsellum or large artery forceps, and gently moving our hand backwards and forwards with a to-and-fro motion, we can usually succeed without any great traction in bringing out the tent. A much more formidable complication I have already mentioned, as occasionally following the use of a tent which has been pushed too far within the uterus, and over which the os externum has closed. Such a result, however, can only be the sequence either of great carelessness in the use of the tent, or of the employment of too short a one; and, to avoid it, we ought never to introduce a tent under two inches in length. In extracting the tent, Sims recommended us invariably to dilate the vagina by the speculum; but this I seldom, if ever, do, and I never even use any instrument for the extraction, unless the string which is attached to the tent gives way,—a frequent occurrence, however, owing to its often becoming softened by its prolonged soaking in the vaginal discharges. The entrance of air into the dilated cervical and uterine cavities is a danger I certainly never met with, and can scarcely even conceive possible: or even if it did occur, it does not seem likely that it would produce any very injurious result.—*Edinburgh Medical Journal*, Aug., 1870, p. 107.

97.—ON THE VALUE OF INDIAN HEMP IN MENORRHAGIA AND DYSMENORRHOEA.

By Dr. ALEXANDER SILVER, M.A., Assistant-Physician to
Charing Cross Hospital.

I am desirous of bringing the following cases before the profession not because the discovery of the value of Indian hemp in these troublesome maladies is new, but rather because it is not sufficiently well known. It is to Dr. Churchill, of Dublin, the profession is indebted for making known the excel-

lent effects of Indian hemp in uterine disorders; nevertheless, I was led to the conclusion independently.

A woman, whose case I regret I cannot give in greater detail, came to Charing Cross Hospital complaining of violent pain in the loins, and of a persistent bloody discharge, the blood being sometimes clotted, and then giving rise to severe bearing-down pains during expulsion. This had lasted without interval for upwards of six months, insomuch that she was greatly reduced both by the discharge and the constant pain. To get rid of the latter, all sorts of sedatives, among others the hypodermic injection of morphia, were tried locally and generally. At the same time iron was given in considerable doses, but altogether without effect. The pain was so harrassing that, after having tried a variety of sedatives, I was induced to prescribe ℞xxv. doses of the tincture of Indian hemp, in hopes of giving some relief, and, to my surprise, when she returned we were told that the medicine had acted like magic, both pain and discharge having totally ceased after a few doses. Some iron was ordered, on account of the anæmic state of the woman, and she continued under observation for a considerable time, during which she remained quite well. Afterwards her visits were discontinued, and she has not now appeared for some months. It is perhaps fair to conclude that she remains well. Some similar cases, although not of the same intensity, yielding to the remedy in an equally satisfactory manner, an inquiry was made into the history of the drug, but neither in our ordinary works referring to the diseases of women, nor on *Materia Medica*, was mention made of it as producing good effects in menorrhagia; at last, however, it was found that hemp had been used in such cases with very good results by Dr. Churchill. Conversing with professional friends, I have found most equally ignorant on the matter as I had been, and I accordingly resolved to collect a few cases (a few of the most recent have been selected) as the best way of enforcing the value of the remedy.

Here is a case which is typical in its way.

(a) *Case 1.*—E. C., aged 24. Married fifteen months; no family; no miscarriages. Has always been regular till she had scarlet fever in December, 1869. Since she recovered from that fever has suffered from great general debility, pain under left breast, and flushings succeeded by cold chills. Menstruates every three weeks, the discharge being sometimes scanty, at other times very profuse, accompanied by pain in the loins. Came under the care of Dr. Silver on June 10th, being at the time unwell; the discharge very profuse, and accompanied by much pain. She was ordered tr. cannab. indicæ, ℞xx., bis die,

(a) Notes by Mr. A. Warren.

and found relief after the first dose; the discharge and pain speedily ceased.

June 13. Suffers now merely from debility. To have liq. ferri perchlorid. ℥xv., in inf. quassia.

June 17. No return of flow; debility still continues; much frontal headache. Iron does not suit; to have quinine.

July 5. Headache nearly gone, and much better otherwise. Flow begun again, normal. A little pain in the back. To have quinine again.

No. 2 is also satisfactory, and would have been more so had the woman been better fed; still she has greatly improved.

(a) *Case 2.*—C. H., aged 39, married twelve years; one child aged 11 years; six miscarriages, occurring generally between the sixth and seventh month; last miscarriage last February. General health good; menstruation always regular. Husband healthy; occupation, straw-hat maker. For the last nine months has lived rather low, husband being out of work. After each miscarriage discharge profuse, continuing about a week. Just before the time of the last menstruation (May 18) received a sudden fright, and immediately became unwell. The discharge was more profuse than usual, and was accompanied with pain in the loins. Came under Dr. Silver May 24th, and was ordered the tinct. cannab. indicæ. Found relief after the first three or four doses, losing the pain and discharge. Had first dose of medicine on May 24th, continued it until June 6th. Feels now very well with the exception of slight debility.

June 21. Flow recurred; scarcely any pain, only very slightly in the back; no clots as formerly.

July 5. Flow lasted nearly a week; very little pain—not more than when in usual health; has felt tolerably well since, but lacks strength; not over well fed.

These two cases, although satisfactory in one way, are not so striking as might be, the excessive flow not having continued so long as in the first case noted. The following is in that respect more striking, and illustrates the speedy and efficacious action of the hemp in proper cases. It will be remarked that when the discharge recurred at the normal time the patient was in the country, and not under treatment. Had she been at the hospital she would have been ordered the hemp in smaller doses for the relief of the pain. The age of the patient is another feature in the case worthy of note, although not unfrequently the menstrual flow continues until a considerably more advanced age.

(b) *Case 3.*—A. C., aged 51, married; has been married thirty years; had six children. One child was born at the eighth

month of pregnancy, lived four days after its birth. Two other children born at full time lived only a few hours after birth. Father and mother both living — father in good health, the mother bedridden. Has worked very hard as a charwoman up to three or four years ago. Began to menstruate when eighteen years old. Previous to that time suffered very much from pain in head, back, and side. Had her first child in her twentieth year, and the last in her twenty-seventh year. Ever since that time has been subject to a pain in the left groin. It would come and go, and was accompanied by a swelling in that region. When the swelling went, the pain went. She had then a nasty yellow discharge lasting perhaps a week. Yet during all that time she was regular to the day, and continued to be so until March 17th, when, being unwell at the time, an alarm of fire was given, and as she was the only person in the house, she was greatly alarmed. From this time up to May 10th she continued to be ill, sometimes more, sometimes less. The discharge was passed partly clotted, and with great pain. When seen first she was ordered a tonie, but that did no good. On May 10th she had tinct. cannabis ind. ℞xxv. bis die (Tuesday). On Thursday the discharge stopped. Since then she has been quite well, but weak, till she went into the country. After being there a week, the flow recurred, with a good deal of pain and partially clotted; this occurred on June 4th. It lasted six days, and the pain was very severe; but the flow ceased at the normal period, and she is now (June 21st) well, but weak. To have steel.

The above cases might be called appropriate for the use of the remedy in every respect, the menorrhagia being merely functional, as we term it, and not dependent on any organic mischief. But even in those instances where there is local mischief in the shape of tumours or malignant disease, the hemp still asserts its influence over the sanguineous discharge, but only for a time. Upon the whole, therefore, if the hemp given repeatedly, each time arresting the discharge and relieving pain, but when omitted these again recur, there is just cause to suspect the existence of uterine mischief other than merely functional disturbance. Thus, in a case of uterine fibroid tumour of great size, rising nearly to the umbilicus, and, of course, elongating the body of the uterus, the periodic flow was greatly increased, and the patient was consequently much weakened; even here the hemp proved satisfactory in arresting the discharge, but not in preventing its recurrence. In another instance, where the discharge proved intractable, a small polypoid growth was discovered, and removed, to the relief of the patient; but perhaps the following case exhibits those features in such a fashion as best to impress them on the mind:—

Case 4.—E. M., aged 38; married seven years; no family;

three miscarriages within first three years of married life, occurring about the fifth month; always healthy; husband healthy. After the last miscarriage she was quite regular till the end of last summer (1869), when, without any assignable reason, the flow became much more frequent and abundant, and was accompanied with much pain in the back, worse just before the usual period. Instead of being fluid, the flow became clotted, but there was no special bearing-down pain. Gradually she became weaker, and the flow came once a fortnight, and sometimes oftener. She applied to Dr. Hutcheon, of Priory Road, Wandsworth Road, Lambeth, and got relief from her pain, but there was no change in the flow. He afterwards brought her to me, when she was ordered cannabis indica, with speedy relief. She took in all three or four doses, but again the discharge returned. The remedy was repeated with a like result. The following note bears date:—

June 10. After four doses (℥xx) the flow again ceased, but a white discharge succeeded. She left off the medicine, and again the discharge recurred. To have cannabis and iron alternately.

17th. The cannabis has again arrested the discharge, but the flow returned soon after with clots and bearing-down pain. She has now a very great discharge, but is well otherwise. To have cannabis with ergot and iron alternately.

By this time, suspecting something more than mere functional disturbance, I was anxious to procure a more exact knowledge of the origin of the discharge, but the condition of the woman precluded anything like a vaginal examination. Still as the hemp had always been successful in arresting the sanguineous flow it was given in somewhat increased doses with the usual result.

24th. Has taken cannabis twice a day. Flow stopped completely on Tuesday. To-day was examined by Dr. Black, physician-accoucheur, Charing Cross Hospital, who found malignant disease of the cervix involving the os uteri and beginning to invade the vagina.

The origin of the discharge, both coloured and colourless, was thus accounted for.

This case serves to show how far we may rely on the drug for arresting sanguineous uterine discharges from whatever cause; it also shows that it may be employed to facilitate uterine examinations which might be otherwise objectionable.

A certain number of practitioners, I find, have been in the habit of using this remedy, especially for painful menstruation not being mechanical. Dr. Hunt, of Hoxton House Asylum, assures me he has given it in over a hundred cases and never

knew it to fail after the third dose in relieving pain and discomfort.

The dose I ordinarily prescribe is twenty minims of the tincture. It is best given in combination with aromatic spirit of ammonia.—*Medical Times and Gazette*, July 16, 1870, p. 59.

98.—IS IMPERFORATE HYMEN EVER HEREDITARY?

By Dr. HORATIO YATES, Senior Surgeon to the Kingston General Hospital, Canada.

Not long since a respectable farmer's wife, brought her daughter to me for advice. The girl was a fine, well-developed young woman of 18. She had never menstruated, nor had ever any vicarious hemorrhage. From her physical appearance, and from the history of the case, I at once suspected an imperforate hymen. The belly was only slightly swollen, and she had the ordinary monthly constitutional symptoms, but without any "show," I found, on making a vaginal examination, a convex, bulging, elastic tumour at the orifice of the canal. After a dose of castor oil, followed by one of laudanum, I made a crucial incision large enough to admit the index finger, when there commenced to flow, in a steady stream, an inodorous, chocolate-coloured fluid, of the consistence of treacle, to the extent of forty-two ounces. The incised hymen was as thick as buckskin, and as firm as parchment. I kept her in town and in bed for four days, lest inflammatory symptoms should occur, and directed in the meantime tepid water injections, slightly impregnated with carbolic acid, eight drops to the pint. The girl returned home all right, and I hear has remained in perfect health ever since.

Thus far is detailed an ordinary case of imperforate hymen, with the common treatment; and but for what is to follow, I should not think of making a public record of it.

This girl's mother informed me that another daughter of hers, an equally well-developed girl, had been affected in the very same way as this one: had never menstruated, and at twenty her belly had become so much swollen as to induce some of her kind neighbours to suspect pregnancy. Rather suddenly, she became ill, and, as suddenly, died, undoubtedly of peritonitis. She had been seen only by an ignorant quack. I concluded that without doubt this was also a case of imperforate hymen, some of the accumulated fluid ultimately finding its way into the peritoneal cavity. And it was this fatal issue which induced the mother to make the journey to Kingston with her second daughter. These two cases might be called a coincidence. But soon after my patient had returned home,

there appeared in my office her brother's wife with two female children, one eleven months and the other 3 years old, and each of these had an imperforate hymen. This was too much to be called a coincidence. This was clearly an example of an hereditary, or at least of a family peculiarity, and the more curious from the fact of a transmission through the *father* to the next generation.

Most medical observers have noticed peculiarities of formation or malformation of one sort or other running in families. There is now a man living in this town who has six fingers (*i. e.*, five fingers and a thumb) on each hand, and six toes on each foot. He has a brother with the same redundancy, and he is the father of four children, all of whom have precisely the same redundancy. And there is also a woman living in this town who had a hare-lip, and on five of her seven children I have operated for hare-lip. The other two were unaffected. None of the five had cleft palate. Parallel cases need not be repeated, but, I doubt not, have been observed by most medical men.—*Lancet*, June 11, 1870, p. 833.

99.—CASES OF ACUTE LEUCOCYTHEMIA IN CONNEXION WITH PREGNANCY.

By Dr. ROBERT PATERSON.

[It is a peculiarity of this disease, that, although essentially a chronic one, upon the occurrence of some change-producing event in the constitution, such as child-birth, it is liable to assume a rapid and speedily fatal course. M. Vidal has shown that the first positive indication of the disease is to be found in enlargement of the spleen, but Dr. Paterson points out that by means of microscopic examination of the blood, its existence may be diagnosed much earlier than that period at which the splenic tumour is discernible. This is of the greatest importance during pregnancy, because there is a liability during labour to hemorrhage and that to a considerable amount. Of course to be forewarned is to be forearmed.]

If we wait for splenic or other glandular enlargements, we wait too long; they are in this class of cases recognisable only when the case is hopeless, and when they are assuming such rapid development as to lead to a speedy and fatal termination.

The first case I am about to relate—that of Mrs. S.—was the first that had occurred to me in practice, and I candidly admit I was quite unaware either of its nature or danger.

Mrs. S., aged 26, an exceedingly robust and healthy young woman, married, and three months afterwards became pregnant. I was asked to see her several times during her early

pregnancy, in consequence of severe sickness and vomiting and other symptoms, all referable to that state. These symptoms, however, gradually passed away, she enjoyed good health, was plump and well-coloured, and able for the usual amount of exercise. I was again asked to see her, about a month before her confinement. She had then a very sallow look, with hollow eyes, and rather rapid pulse (90); but I was assured that she felt quite well,—that although sometimes slightly feverish at night, and languid in the morning, she generally felt in good spirits; the urine exhibited no trace of bile.

The labour came on at the time expected, and was natural, the uterine contractions were vigorous, and she was delivered of a healthy male child, ten hours after the commencement of labour. Very troublesome and persistent hemorrhage followed the expulsion of the placenta, which, however, was readily controlled by repeated doses of *secale cornutum*. For three days she continued to improve, and milk was secreted, the lochial discharge was scanty, and her pulse was high, but her condition at the end of this period was satisfactory. About the sixth day a marked change to the worse took place,—the pulse became more rapid (120), there was considerable heat of skin, with increased tawnyness of it; there was decided enlargement of liver and spleen, and some slight increase in size could be noticed in the glands of the neck, along with difficulty in swallowing, but to no extent. It was soon after this that, in consultation with the late Sir James Simpson, to elicit the nature of the case, we determined to examine the condition of the blood. This was accomplished next day.

The blood thus examined presented an unusual number of leucocytes or white cells in the field of the microscope,—so much so, indeed, that not a fourth part of the globules in view were red corpuscles. The microscopic examination speedily cleared up the diagnosis. We had no doubt a case of leucocythemia before us, indicated by the state of the glands and blood, and we had as little doubt that we had an unpromising case—one that would eventually proceed to a fatal termination; but we had no idea that, within twenty-four hours from the discovery of the disease, death was to put an end to further experience or treatment. Within this space of time, the principal change which took place was that of rapid enlargement of the glands of the neck; the difficulty of swallowing, before noticed, increased much, and any attempt to swallow in the horizontal posture produced such feelings of suffocation that she jumped upright in bed gasping for breath; at last she could not lie down at all; sitting up on the edge of the bed afforded the greatest relief; and when I last saw her, she was thus seated, restless and desponding, with great enlargement of the lymphatic

glands of the neck, and with total inability to swallow even a teaspoonful of water. Death took place suddenly on the evening of the eleventh day, apparently from suffocation and while sitting up in bed and gasping for breath, but with all her mental faculties clear to the last. The infant lived, and has been reared, and is now a healthy and robust child. A post-mortem examination was decidedly refused.

The case above related made me sufficiently alive to the necessity of watching cases exhibiting similar phenomena to the above, before their confinement, when I was asked to see Case 2.

Case 2.—Mrs. M'C., the wife of a policeman, was confined under the hands of a midwife, who requested my assistance, in consequence of considerable hemorrhage after delivery. As this case occurred within a few weeks of the one I have just described, and as her appearance much resembled the other, I made a somewhat careful inquiry into her history and symptoms, as well as a minute examination into the state of the patient at the time. She was a primipara. She was originally of delicate habit of body, but was strong and well when she married. She suffered much from the early symptoms of pregnancy, and especially from severe sickness and vomiting, and for long she could take little or no food. Along with these symptoms, she became pale and languid; had to remain in bed the most part of the day, and became quite unable for any active employment about the house. Towards the close of her pregnancy, she became very yellow or sallow coloured,—so much so, as to induce her neighbours to declare that she laboured under jaundice; but some skilled old woman in the neighbourhood declared this was not so, from an examination of the urine. This history brings me up to the point at which I saw her after her confinement. She had lost a considerable quantity of blood; was pale and very sallow, especially around the mouth, nose, and eyes; but the blood which she had lost did not appear paler than usual; considerable enlargement of the spleen and liver was recognised, at the time I was exciting the contractile action of the uterus. Next day at my visit, I made a more careful examination of those organs, and also of the blood microscopically. The edge of the spleen was distinctly felt more than half-way between the false ribs and iliac bone, while the liver occupied an extended space of more than two inches below the ribs, occupying fully the half of the epigastrium, besides pressing considerably upwards. There was slight enlargement of the lymphatic, thyroid, or other glands. The pulse was rapid—120; the breathing laboured; no abnormal sounds in respiration; there was a bruit along the

arteries in connexion with the first sound of the heart. The child was alive, and apparently healthy. The blood in the field of the microscope was full of white cells, and after a short time the blood-discs arranged themselves into rows, while the white or rather transparent cells occupied the greater part of the field of the microscope. It is no doubt loose language to talk of the blood being full of white cells, or containing a large or considerable number, but I had really no means of calculating the relative proportions of white cells and coloured corpuscles, so that I only state generally the impression it gave me at the time. This patient got all kinds of nourishment, with iron preparations and stimulants, but she never had any secretion of milk; the lochial discharge was pale and scanty; the fever increased, the pulse becoming gradually more rapid, with greatly increased restlessness; she could not sleep, and morphia and nepenthe failed to soothe her. Gradually the fatal enlargement of the lymphatic glands of the throat and neck and upper part of chest occurred, increasing slowly, and as surely gradually cut my patient off by asphyxia fourteen days after confinement. Death in this case occurred very much in the same way as in the former one, only more slowly and exhaustively. I had repeated opportunities of examining the blood of this patient from the day after her delivery till the day of her death, and I could not recognise any increase in the number of white cells or diminution of those of the red. A post-mortem examination in this case was also denied.

Since the occurrence of the two cases above described, I have been watchful over all the cases of pregnancy I have seen, and have especially noted and examined the blood of those who presented much sallowness of skin, much languor and inability for exertion, and I have contrasted this with a similar examination of the blood of pregnant women in whom no such symptoms were to be noticed: women of healthy and ruddy complexion, and free from languor and bodily inactivity. The result has been remarkable, in so far as that, in almost every sallow case, with complaints of weakness and listlessness, and yet without any recognisable enlargement of spleen, liver, or other glands, the blood has been found to be charged with leucocytes, while not a single white cell was to be seen in those of the ruddy and otherwise healthy women. Pregnancy, says M. Vidal, in four cases out of ten, is the commencement of the disease. Out of a number of cases which I have watched carefully during the latter months of pregnancy, the sallowness of whose skin, and the languor of whose system was specially remarkable, I shall give the history of one whose symptoms and the condition of whose blood gave me much anxiety, both as to the result of her labour and her recovery from it. Both the labour and con-

valescence have terminated favourably,—a result I could hardly at one time have contemplated.

Mrs. L. consulted me early as to the state of her health. She stated that she was about five months pregnant of her fourth child; that she had had much hemorrhage with her last baby, from which she had never entirely recovered; that her present ailments were principally languor, lassitude, and inability for any exertion, and, with the exception of a slight cough, she had no other symptom of the least consequence. She presented a pale sallow complexion, with feeble and rapid circulation, poor appetite, some morning sickness, with tendency to faint; no disease was discoverable in the chest. I had just become cognisant of the effects of leucocythemia in pregnant women, and very shortly afterwards took an opportunity of examining the blood of this patient under the microscope, and also of ascertaining the condition of the spleen, liver, and other glandular organs. This examination led me to the discovery of a large area of white cell-blood, but without being able to recognise any enlargement of the liver or spleen; there was, however, a certain amount of turgescence of the glands of the neck—a symptom which materially increased during the latter stages of her pregnancy, but was unaccompanied with difficulty of swallowing. The thyroid and submaxillary were the glands most affected. The treatment recommended was iron tonics, with stimulants, and abundance of carriage exercise in the open air. I cannot say that much improvement resulted from this means, for she continued to increase in sallowness and general weakness. At last the anxious period of her confinement arrived. I had determined to resist the use of chloroform, and to give ergot as soon as the state of the parts admitted; so, when labour advanced to nearly the full dilatation of the os uteri, I gave repeated and full doses of this drug. The result was satisfactory; the pains soon assumed a persistent character, and the child was delivered, after a labour of six hours' duration, well and healthy. The uterus contracted firmly, the placenta was thrown off naturally, and no post-partum hemorrhage occurred. Liberal diet, with wine, was allowed from the moment of her confinement, and a slow but steady recovery followed. During the period of nearly four months over which we have travelled, the state of the blood was frequently examined, and I could not say that on any of these occasions I could discover a smaller number of leucocytes than existed at my first trial. There seemed always to be about the same number of white cells and rows of blood-corpuscles. I also examined the blood lost per vaginam at her confinement, and found it to contain about the usual number. Since her confinement, however, there has been a decided diminution of

white cells, her countenance has assumed a more ruddy and healthy appearance, and she has been able for some little exertion, without fatigue. Six weeks afterwards she was sent to the country, and I have heard that she is steadily progressing to complete recovery. I may state that the enlargement of the glands of the neck was somewhat persistent, not having diminished materially, although they gave little discomfort, when I last saw this patient.

It is impossible for me to say what element in the history of this most interesting case is the one most conducive to practical results or to future practical guidance. My own impression is that, by saving the blood after confinement, we gained, as it were, the first step to future good results. All, it will be observed, was most unsatisfactory up to the period of confinement; but after that event, which was accomplished without prolonged suffering, and with no subsequent hemorrhage, a steady and favourable progress was initiated, and a naturally good constitution allowed a fair start towards recovery. How these leucocytes are thrown off I do not pretend to determine; but as Virchow is clearly of opinion that they are never under any circumstances converted or changed into ordinary blood-corpuscles, so we must presume that they are eliminated from the body by some other means, most probably by the lungs. Still I should suggest that other means used in this case ought not to be neglected, such as the persevering use of iron, stimulants, and other forms of nourishment, both administered before and after confinement. The effect of this disease is curious as regards the foetus. The mother's blood was charged with leucocytes, and consequently there was a proportionate diminution of the blood-corpuscles in the maternal circulation, yet the children suffered in no way, and were robust and healthy when born. This was the result of my three cases, demonstrating as it does most clearly the important physiological fact, that there is no direct communication between the blood of the foetus and that of the mother.—*Edinburgh Medical Journal*, June 1870, p. 1074.

100.—COMBINED ENUCLEATION AND AVULSION OF A FIBROUS TUMOUR OF THE UTERUS.

By Dr. J. MATTHEWS DUNCAN, Lecturer on Midwifery, &c.,
Edinburgh.

I put on record the following case because it is a remarkable example of an operation which is not frequently performed. This procedure, which I have now many times resorted to, and always with success, consists in removing a uterine fibroid from its bed of muscular tissue by seizing and pulling by strong vol-

sellæ. I have resorted to it only in cases in which the discharges—bloody, serous, and purulent—from the tumour were so large and so long-continued as to imperil the patient's life; and I have only resorted to it when no other means of relief seemed available. I proceed not to enucleate the tumour or separate it from its attachments and then to remove it, but simultaneously to remove and enucleate, or to enucleate by avulsion. The operation is long and laborious, and has no claim to elegance or brilliancy, being rather rude and coarse. There are, no doubt, many dangers in the operation which I have been fortunate enough to avoid, some of which I have described in former papers in this journal, but which I am not prepared here to enter upon.

The great difficulty of the operation is merely mechanical. It does not lie in the enucleation: some tumours are connected with the uterus by tissues so delicate as to offer scarcely any resistance to the disembedding force: others are united at points by strong bands of muscular and connective tissue to their beds, and these bands seem to me to be connected chiefly with the part of the tumour which is last separated; and in the operation it may be difficult to distinguish such connecting bands from a prolongation or continuation of the tumour itself. The former loosely-connected tumours come away easily, if small, and are as smooth and clean and rounded as an egg or a pear. The latter are much lacerated, especially if large, and have numerous tags and bands and attached, of various dimensions and lengths.

The great difficulty of the operation is in pulling the tumour through the undilated passages. The operation, indeed, has some analogies with the obstetric forceps operation, and, like it, should not be done quickly or hurriedly. The first obstruction is in the cervix uteri, the opening also in the wall within which the fibroid is lying, and its adhesions to its bed. These three sources of difficulty combined form the first cause of obstruction. The second, and in the case of a large tumour the more powerful and embarrassing, is the perineum and orifice of the vagina, if these parts are in a natural or nearly natural state.

Mrs. S., æt. 43, had been twenty years married, sterile, enjoyed good health till somewhat above two years before the operation to be described. Then the menstrual flows became profuse, and were accompanied by pain. During the last year the bloody flux was constant and often profuse. She was under the care of Dr. Meikle, of Douglas, and had also other advice. Summoned by Dr. Meikle, I visited this patient on the 15th June, and removed a fibrous tumour weighing one pound and three-quarters. In the operation I was greatly aided by Dr. Meikle and his son.

The patient was extremely anæmic and weak, and had a bloody discharge. In the hypogastric region was a hard, rounded tumour, whose upper margin was on a level with the navel. Examination per vaginam discovered that the tumour lay high up; the cervix, dilated to fully an inch in diameter, could just be well reached by the examining finger. The os had thin rigid lips. The tumour pressed on the cervix.

To enlarge the os I cut its margin freely on each side with scissors. I then seized the tumour by a volsella, then by two, and kept pulling away, with few intermissions, except when the instruments tore their way out of the tumour. After about an hour's work, and repeated pushing back of the uterine wall by the finger, the tumour began to distend the perineum. But then further progress appeared unattainable. Continued efforts, however, brought it down a little farther so as to be within reach of the knife; and I attempted to cut it spirally, but really only succeeded in making an oblique cut into it, which allowed the lower portion to come through the orifice of the vulva. To this part a strong cord was now applied for the purpose of increasing traction. At length, after the whole operation had lasted about two hours, and after some pieces had been torn away, the whole tumour was extracted; but before its separation was complete, two thick bands had to be cut through.

The tumour was everywhere raw or recently denuded, and was quite bare of capsule or any covering. Some hemorrhage took place during the operation, and continued for some hours after it.

The woman was, after the operation, in a state of the greatest exhaustion, and occasionally very faint and pulseless. When I left her, in charge of Dr. Meikle, junior, I had the gravest apprehensions as to her rallying. But she made a slow and uninterrupted recovery. She menstruated naturally in July.—*Edinburgh Medical Journal*, Nov. 1870, p. 390.

101.—NOTES ON THE FŒTAL CIRCULATION.

By Dr. ANDREW BUCHANAN, Professor of Physiology in the University of Glasgow.

Some physiologists have taught that the placenta produces upon the blood the same changes as the lungs—the blood being said to be black or venous in the umbilical arteries and of a florid red colour in the umbilical vein. It is easy in cases of child-birth, by some very simple experiments, to show the inaccuracy of this opinion. If, after the child is born, instead of putting two ligatures round the cord and dividing it between them, only one ligature be applied, and after dividing the cord

on the placental side of the ligature the blood be collected in a tumbler or other glass vessel, assisting the flow by stripping the cord downward, then from three to four oz. of blood can easily be obtained. Now the blood is never partly of the one colour and partly of the other, but either wholly black or wholly red; and it can be obtained of either colour according to the mode in which the experiment is performed. If the cord be tied the moment the child draws its first breath and cries, then the whole blood, both from the arteries and from the vein, is black; but on allowing it to stand exposed to the air it becomes florid on the surface like ordinary blood, showing it to be quite susceptible of being acted on by oxygen if there had been any of that gas supplied to it by the placenta. We infer, therefore, that the black blood of the umbilical arteries undergoes no change of colour in passing through the placenta, but returns through the vein of the very same hue. If again the child be allowed to breathe freely before the cord is tied, then the whole blood obtained from the cord is of a bright red colour, which it has manifestly acquired in the lungs of the child before going to the placenta.

Do the respiratory movements ever occur before birth?—If the muscular act corresponding to inspiration were performed before birth when there is no possibility of air finding access to the lungs, it is manifest that the whole pneumatic effect would be to draw the blood from the systemic veins into the chest. Does nature ever employ this expedient to assist the circulation of the foetus, either within the uterus or during parturition, especially when from compression of the cord or other cause, the progress of the blood may be impeded? I am disposed to answer this question in the affirmative, founding my opinion on a case which occurred to me twenty-four years ago. It was a case of twins; the first of which was born easily, but not so the second, for there was an interval of no less than three hours between the births of the two children. When the lower limbs were at length brought down, there was a complete suspension of labour for half an hour, during which the child lay with its chest in the vagina, and the head still included within the uterus. As the cord was felt beating regularly and vigorously, I did not deem any interference necessary; still, however, I could not avoid satisfying myself from time to time as to the pulsation of the cord. In doing so, as my finger rested on the ribs, I was surprised to find them move, and on the movement being repeated at regular intervals, my whole attention was fully aroused, and to make my examination more sure, I placed the fingers of the other hand on the opposite side of the chest. I had then full time to satisfy myself that the ribs on both sides of the chest were undergoing alternate movements of elevation

and depression, resembling exactly the rhythmic movements of respiration. All this took place at a time when, from the position of the child's head within the uterus, access of air to the mouth and nostrils was physically impossible. Strong contractions now came on, and the child was at once expelled.

Were this observation confirmed, it would be important physiologically, as evincing that the reflex acts of respiration are excited by a sense of obstruction to the passage of the blood through the heart, and not by any feeling connected with the aeration of the blood and seated in the lungs, which are dormant before birth.

I need scarcely say that the question here proposed is quite different from that which has been so much discussed, of the child actually inhaling air and crying before birth.

I may add that ever since, whenever an opportunity offered, I have carefully sought for the same phenomena, but never with success, although never with a perfect correspondence of conditions in the mother and child.

Whether any similar movements occur *in utero* might be judged of from observations made on whelps still within the transparent amnion; or just extruded and placed, before they have breathed, under water, where it is well known they can live for hours.

Twins, one of which unconsciously sucked his brother's blood, and so deprived him of life.—This case occurred fourteen years ago. I can find no memoranda made of it at the time, but the history of it was so remarkable that the essential points are as fresh in my mind as if it had taken place yesterday.

The labour on the part of the mother was easy. The child first born was remarkably vigorous, drawing up its limbs, struggling and respiring deeply. It seemed to be full-blooded, the face being tumid and somewhat livid, and the whole surface having a similar hue. It cried lustily before the cord was tied, and there was no unusual delay in tying it. The other child presented a marked contrast to the first. It was pale and exsanguine. It lay fully extended, and never bent a limb, although its joints were quite flexible. It never cried, but after some time a feeble respiration was established. I could not view these appearances without some alarm, and unfortunately the idea of hemorrhage from the placenta presented itself to my mind, and I immediately tied the cord which was still beating, much to my regret on reflection afterwards. The child was kept warm, and was able to take a little nourishment. It continued to breathe feebly, and survived about thirty hours. I may add, that I never saw a more beautiful child than this; its pure white skin resembling Parian marble, and its perfect

symmetry coming fully out as it lay straight and with extended limbs, an attitude in which a living child is so rarely seen.

There was only one oval placenta to which both cords were attached. I brought it away with me, and gave it to Professor Allen Thomson, who kindly undertook to examine it. He found free vascular communication throughout every part of it, so that a liquid injected through the vessels of the one umbilical cord returned readily by the other.

It is clear from this history that the child first born, by the vigorous inspirations made during his long fit of crying, filled his own vessels, both pulmonary and systemic, with blood, and so unconsciously drained off from the placenta the share of the vital fluid which should have been the heritage of his brother.

Could the circumstances have been foreseen, the cord of the child first born should have been tied without a moment's delay, so as to prevent any undue draining of the placental veins; while the tying of the cord of the second child should have been deferred as long as possible, that is, till after the expulsion of the placenta, which should have been compressed, and the cord stripped downward towards the child.

Whenever, therefore, a child is weak from want of blood, the greater the delay in tying the cord so much the better for the child: because the umbilical arteries contracting under the influence of the cold, and meeting with a greater resistance from the gradual coagulation of the blood in the capillaries of the placenta, are continually sending less blood thereto, while the aspirations of the child through the umbilical vein are continually becoming stronger under the influence of the oxygenated blood, and the whole difference between the blood sent to the placenta and that drawn from it tells in favour of the child. Besides which the compression of the placenta after extrusion, and the stripping of the cord downward towards the child, give an additional supply of blood, which is the great requirement.—*Glasgow Medical Journal*, June 1870, p. 447.

102.—ON THE TREATMENT OF COMMENCING CHRONIC DIARRHŒA IN YOUNG CHILDREN.

By Dr. EUSTACE SMITH, Physician to the North-West London Free Dispensary for Sick Children, &c.

[Chronic diarrhœa in young children not unfrequently begins very insidiously, owing to a slight chill, or a meal of improper food. A chronic catarrh is often induced which becomes less and less amenable to treatment the longer it continues. Frequently, however, the purging speedily ceases, and the child appears to have recovered. The motions, however, are not

healthy, they are large, sour, and pasty-looking. The child gets pale, is occasionally sick, and his breath is sour and offensive. After some weeks or months, during which he has got thinner and paler, the child is seized with an attack of purging, which becomes more severe, he loses flesh rapidly, and his state becomes one of great danger.]

These cases are often looked upon as instances of disease of the mesenteric glands, but the most careful examination of the belly will seldom furnish any satisfactory evidence of glandular enlargement. The temperature is lower than in health, and seldom rises higher than 98° Fahr. in the rectum. There is no particular desire for drink. The child is a little restless at night; he takes his food with a considerable appetite, and even sometimes with voracity: the food, however, does not nourish him, and appears hardly changed in the stools.

These cases, obstinate as they prove when not treated judiciously, will yet yield quickly to suitable measures; and unless the weakness and emaciation are very great do not as a rule present any great difficulty in their management.

The object of the present paper is to describe the method of treatment applicable to these cases during the period, often sufficiently extended, before the diarrhoea has become confirmed; when the child is becoming more and more listless and pale, is losing flesh and strength, while his motions, infrequent but copious, exhibit the characters which have been described above.

The presence of undigested food in the motions of a young child, especially if that child exhibits evident marks of deficient nutrition, is a sign that the diet is an unsuitable one and requires alteration. Whether the digestive weakness be a simple functional derangement, or be due to the existence of organic disease, in either case our object is the same—viz., to adapt the child's diet to his powers of digestion, so that the food he swallows may afford him the nourishment of which he stands in need, and may leave as little undigested surplus as possible to excite further irritation of his alimentary canal. In such cases, however, this accurate adaptation of diet is often by no means an easy task. Articles of food on which we are accustomed to rely, and from which a healthy child derives his principal support, will here often fail us altogether. Thus, farinaceous food should be given with the utmost caution, and will seldom be found to agree except in very small quantities. Even milk, our great resource in all cases of digestive derangement in children, must be sometimes dispensed with. It is not so very uncommon to find cases where milk, whether diluted with water, or thickened with isinglass, or with farinaceous food, cannot be

digested. So long as it is taken, the pale putty-like matter of which the motions consist, and which is passed in such large quantities, is evidently dependent upon the milk diet, and resists all treatment so long as that is continued. In such cases, which occur most commonly in children between one and two years of age, the milk must be replaced either wholly or partially by other foods.

Although farinaceous food is not as a rule well borne in these cases, yet Liebig's farinaceous food for infants (as prepared by Mellin, of "Liebig's Patent Concentrated Milk Company") may always be tried, and seldom disagrees even with the youngest infants. In its preparation the starch of the wheaten flour, which forms one of its constituents, is already converted in great measure into dextrine and grape sugar, so that the most important part of the work of digestion is performed before the food reaches the stomach.

Whatever be the diet adopted our object is to keep up the nutrition of the body with the smallest possible amount of irritation to the alimentary canal; and the food, whatever it may be, which will produce this result, is the food best suited to the case. Without attention to this point little good can be effected by the use of drugs alone. The successful adjustment of the diet, an adjustment in which the quality and quantity of food to be allowed for each meal are accurately adapted to the powers and requirements of the patient, is a matter which can be properly learned only by experience, and which often makes large demands upon the tact, the ingenuity, and the patience of the medical attendant. This experience every one should labour to acquire, for without it success can seldom be attained in the treatment of the chronic functional derangements of young children.

In all cases, if the patient be a sucking child, he should be limited strictly to the breast; or if he have been only lately weaned, the breast should be returned to. If from any reason a return to the breast is impossible, our great trust should be placed in cow's milk, more or less copiously diluted with lime-water. With children under a year old milk is very seldom found to disagree. If the child be no more than six months old, nothing should be allowed but milk, or some preparation of milk, as milk and lime-water (equal parts), whey with cream, or milk and water thickened with isinglass, or with Liebig's food for infants, in the proportion of one teaspoonful to four ounces of fluid. By using these different preparations a certain variety can be introduced into the diet, and the meals should be so regulated that the quantity taken on each occasion, and the length of the interval by which the meals are separated, may be properly proportioned to one another and to the state

of the patient. The Liebig's food should be given not oftener than twice in the day; and if it excite flatulence, or if any sour smell be noticed from the breath or evacuations, the quantity of one teaspoonful should be diminished, or the food should be even discontinued altogether.

Beyond the age of six months a little weak beef or veal tea, or the yolk of one egg unboiled, may be added to the diet. The egg is best digested when beaten up with a few drops of brandy and a tablespoonful of cinnamon water, as in ordinary egg flip. As with younger infants, the quantity of food to be given at one time must depend upon the strength of the child and the condition of his stools.

If the child be over twelve months old, very small quantities of farinaceous food may sometimes be ventured upon, and will often agree. The best form in which this can be given is well-baked wheaten flour, of which one teaspoonful is all that should be allowed at one time, prepared carefully with milk.

So long as milk is well borne the arrangement of the diet is comparatively an easy task; but in the not uncommon class of cases where milk is difficult of digestion, and can only be taken in very small quantities, a different dietary must be adopted. These cases usually occur in children of eighteen months or two years old. A good scale of diet for a child of a year and a half old, in whom this peculiarity is noticed, is the following, consisting of five small meals in the twenty-four hours:—

1st Meal. One teaspoonful of Liebig's food for infants (Mellin's) dissolved in four ounces of milk and barley-water (equal parts).

2nd Meal. Six ounces of beef-tea, of the strength of a pound of fillet of beef to the pint.

3rd Meal. Six ounces of fresh whey containing a tablespoonful of cream.

4th Meal. The unboiled yolk of one egg, plain or beaten up with a tablespoonful of cinnamon water, a little white sugar, and fifteen drops of brandy.

5th Meal. Same as the first.

In this dietary the first and the fifth meals contain a small quantity of milk. If that be found not to agree, the food may be dissolved in barley-water alone, or diluted with an equal quantity of veal broth, or veal broth alone may be given. In any case the quantities recommended should not be exceeded; for it is wise, at any rate at first, to be sparing rather than liberal in regulating the allowance of food. It is better that the child should be hungry than overloaded, and so long as the

stools retain their pasty character it is evident that the food taken remains in great part undigested.

If the milk agree, it can be gradually increased in quantity ; and as digestion improves, which it will do after a few days of this carefully regulated diet, other articles of food can be introduced, as roast mutton underdone, and well pounded in a mortar ; the flower of cauliflower well boiled in water, or stewed with gravy until very tender. In the use of farinaceous foods great caution should for some time be exercised, and they should be given sparingly until convalescence is completely established, and the stools have reassumed a perfectly healthy character.

In these cases, and indeed in all cases where a special diet is recommended for children, a dietary as given above should be written out by the medical attendant. Not only the kind of food, but the quantity to be given for each meal, and even the hour at which the meal is to be taken, should be duly set down, so that no excuse may be available for neglect or misapprehension. It cannot be too often repeated that in cases such as these it is upon the judicious arrangement of his food that the recovery of the child depends, and that where the diet is properly selected the exact medicine to be ordered becomes a matter of comparatively secondary importance. Even without the aid of drugs at all, the digestive powers would no doubt in many cases speedily right themselves under such a diet as has been sketched out above, but recovery is materially assisted by a judicious selection of remedies. It is well to commence the treatment by an aperient dose of rhubarb and soda, to clear away any indigestible food which may have remained in the bowels, after which the laxative should be followed up by a mixture containing an alkali with aromatics. It is difficult to over-estimate the value of alkaline remedies in the treatment of digestive derangements in children. In all children, in infants especially, there is a constant tendency to acid fermentation of their food. This arises partly from the nature of their diet, into which milk and farinaceous matters enter so largely ; partly from the peculiar activity of their mucous glands, which pour out an alkaline secretion in such quantities. An excess of farinaceous food will therefore soon begin to ferment, and an acid to be formed which stimulates the mucous membrane to further secretion. Alkalies are therefore useful, firstly, in neutralizing the acid products of this fermentation ; and, secondly, in checking the too abundant secretion from the mucous glands. Either potash or soda may be used ; of the two the former is perhaps to be preferred, as being a constituent of milk, the natural diet of children, it may be considered less as a medicine than as

a food. Five to ten grains of bicarbonate of potash may then be given, combined with an aromatic, several times in the day, and it is important that the dose should be taken an hour or an hour and a half after each meal, so that any excess of acid left at the end of digestion may be at once neutralized.

If the stools are loose and are passed frequently, two or three grains of the subnitrate of bismuth may be added to each dose of the mixture, and if much straining be noticed a drop of laudanum will be a useful addition to check the abnormal briskness of peristaltic action.

It is important that the aromatic be not omitted from the prescription. This class of remedies is of very great value in all those cases of abdominal derangement where flatulence, pain, and spasm, resulting from vitiated secretions and undigested food, are present to increase the discomfort of the patient. Such dyspeptic phenomena are usually rapidly relieved by the use of these agents; and the employment of aniseed, cinnamon, caraway-seed, or even of tincture of capsicum in minute doses, will be found of material advantage in combination with the other remedies which have been enumerated.

So long as the tongue remains furred, or the motions sour-smelling, the alkali should be persisted with, and the rhubarb and soda powder can be repeated every third morning. If it be thought desirable at the same time to administer iron, the citrate of iron and ammonia, in doses of five grains, can be added to the mixture. Tincture of nux vomica is also useful in one-drop doses.

The so-called alteratives are in these cases of little value, for it is no good attempting to stimulate the functions of the liver by cholagogues. Under the use of antacids and aromatics with an altered diet, food soon begins to be digested, and the appearance of the stools becomes more healthy. After a time, acid preparations, such as the pernitrate of iron with dilute nitric acid, may be given with cod-liver oil.

A point which must not be overlooked in these cases is attention to the action of the skin. In all abdominal derangements in children the cutaneous secretion is apt to be suppressed early, and the skin soon becomes dry, rough, and harsh. When this is found to be the case, the child should be bathed every evening with hot water, and be then freely anointed with warm olive oil. By this means the suppleness of the skin is soon restored. Warm clothing should be worn, with flannel next to the skin; and as an additional precaution, to guard against the risk of chills, an ample flannel bandage should be applied as a protection to the belly.—*Practitioner*, July 1870, p. 13.

103.—ON OPERATIONS FOR THE CURE OF VESICO-VAGINAL FISTULÆ.

By T. SPENCER WELLS, Esq., Surgeon in Ordinary to Her Majesty's Household; Surgeon to the Samaritan Hospital, &c.

[In an operation for vesico-vaginal fistula, the first consideration is the position of the patient, and the speculum to be employed. According to Dr. Sims's plan,]

The patient is placed lying on her left side, the thighs bent nearly at right angles to the pelvis, the right rather more than the left. The left arm is kept behind and the chest turned forwards, so that the sternum is pressed against the table. A nurse or assistant, standing behind her, holds up the right buttock with the left hand, and draws up the perineum by the duck-bill speculum with the right hand, when the pressure of the air assists in bringing the parts into view.

[The disadvantage of this and of another position since recommended by Simon, is, that no assistant can hold a speculum exactly in a position desired by the operator for any length of time, and very often at the critical moment the edges of the fistula will fall out of view. Some means of supporting the speculum in position independently of an assistant is required.]

It is evident that the support of the speculum should be fixed, not to the table or couch, but to the body of the patient, in such a manner that her movements could do no harm. I was trying to do this upon a plate of gutta-percha moulded to the spine of the patient, when I went to America and saw Dr. Emmet use his well-known instrument, by which the duck-bill speculum of Sims is fixed in the required position by means of a fenestrated blade, which is fitted to the buttock of the patient, who is lying in the semi-prone position, by means of screws. I saw this instrument answer admirably well in Dr. Emmet's own hands, but I could not succeed with it here in any but very small women, even though I had blades of several different sizes used. Besides, it did not answer for the position on the back. While various trials were being made for me to combine the advantages of the instruments of Ulrich and Emmet, Mr. Foveaux, of the firm of Weiss and Co. (acting, I believe, upon a suggestion of Dr. Savage) altered the fenestrated blade of Emmet, so that it could be fastened upon the back instead of the hip, and connected this blade and the speculum by a screw, by means of which the speculum is held in its place. The first time I tried this instrument, with no other aid than that of Dr. Junker (who gave chloroform) and the nurse, I pared the edges

of a fistula, introduced five stiches, and completed the operation.

I believe the instrument is the most useful in practice of any yet made. Mine was extremely well made by Weiss and Co., but I have seen others very good by Krohne, by Paris makers, and by Nyrop, of Copenhagen.

Neugenbauer, of Warsaw, has also contrived an apparatus for use in the prone position. I have seen a fistula extremely well exposed by it by Dr. Neugenbauer himself. But I prefer the lithotomy position and the instrument to which I am accustomed.

In some few cases a good and sufficient view of a fistula can be obtained by simply drawing down the anterior wall of the vagina, or the cervix uteri, by a small sharp hook, or by a thread carried through the mucous membrane, or through one lip of the cervix, while the labia are drawn outwards by a spatula on each side.

For the examination of a fistula before deciding upon the precise details of the operation, as well as for removing the sutures, nothing answers better or is generally so convenient as the semiprone position and Sims's speculum.

Anæsthesia.—I have operated several times without any anæsthetic; but if there is no strong objection in the general condition of the patient, I think it is cruel to expose her to the mental and bodily suffering inseparable from such an operation. For more than three years past I have used bichloride of methylene in this and other operations, and I feel certain that it is quite as effectual and much safer than chloroform, while it is less often followed by vomiting, and headache, and depression.

The Operation may be easy or difficult if light is or is not thrown well into the vagina. No light is so good as bright daylight from a high window near the operating table; this may be intensified by a reflector, and in private houses, where it has been difficult to secure a good light without fear of over-lookers, I have found a lamp and reflector very useful.

Fixing and paring the edges of the fistula is done by hooks or forceps, and knives or scissors. A pair of long-hooked forceps, or a small single hook on a long handle, or a double hook of the same kind, passed well into the opening and hooked into one edge, which it is then made to evert or draw down, is often sufficient; but when the tissues are lax, a second hook passed into the mucous membrane half an inch or more from the edge of the fistula, puts the parts upon the stretch and facilitates the paring. This may be done by an ordinary small scalpel on a long handle, either single or double edge. But the knives most generally useful are bent at an angle of 45° about an inch from the point, and are double-edged.

One border of the fistula having been fixed by one or more hooks, it is transfixed by a straight or bent knife, which is carried first in one direction and then in the opposite until a complete ring, or the whole border of the fistula, is removed. If this cannot be effected, the operator must be quite certain that no scrap of mucous membrane is left, and that two perfectly raw surfaces are ready to be brought together, or union may be prevented. Sims, Bozeman, and Emmet prefer scissors to a knife at this stage of the operation, and have scissors of different lengths and curvatures made for the purpose. This is entirely a question of habit; and I find that I can pare more exactly, and make more regular surfaces with knives than with scissors.

If any artery be divided in this stage of the operation it should be stopped by torsion. Any general oozing may be checked by injecting a stream of iced water upon the part, or by pressure with dry sponge or cotton wool. Small pieces of sponge carried on the end of long handles of wood or whalebone, or in long slender sponge holders, clear the parts from blood very well; but this is better done by a fine jet of cold water with which an assistant may follow the knife and hooks.

Passing the sutures, whether of metal or silk, may be done by small curved needles held by appropriate forceps, or by an ordinary handled needle with the eye near the point. In some cases a short needle at each end of the suture passed from the vesical border of the fistula outwards to the vaginal border becomes a very ready and exact mode of passing the silk.

Sometimes two needles may be useful. The eyed needle and silk or wire is first passed through one edge, and the notched needle through the other. The silk is caught in the notch and drawn through.

A short blunt hook, or one where the short end is bent at a right angle, becomes very useful to fix the spot where the point of the needle should emerge after traversing the second pared edge. It is pressed against the spot, and the needle at once passes through instead of pushing the mucous membrane away. When wire is used it should be drawn over the end of a small forked stem in order to avoid the danger of cutting the tissues between the point of exit of the needle and the edge of the fistula—an accident by no means rare if this precaution is not taken.

Inexperienced operators are very apt to pass their needles and sutures too close to the pared edges of the fistula. They do not include sufficient tissue to permit of firm apposition of the raw surfaces being effected without danger of the suture strangulating the included tissue, and cutting through. Simon gives a sketch to show the distance of the sutures from each

other, and the distance of the points of entrance and exit from the edges; and I think he is right if both deep and superficial sutures are used. If only one row of sutures of equal depth are used then they should be nearer together, not less than six to an inch, and need not be carried quite so far from the vaginal edge.

All the silk or wire sutures having been passed, the bleeding having ceased, and the pared edges having been cleansed by a jet of iced water, the next step is to secure

Apposition of the pared edges.—When silk is used, this is done by tying an ordinary knot on one side of the line of union.

It may be hardly necessary to state that wire should not be tied in a knot like thread or silk, as a simple twist is enough to fix it securely. This can generally be done by the fingers alone. Each end of a wire is taken between the thumb and second finger of each hand, and the forefingers are passed on close to the fissure, the edges of which are brought together by crossing the wire. When the edges are seen to lie close together, not so squeezed that they are inverted, but simply drawn together evenly, a slight turn with the forefingers gives the first twist.

Where the fistula is so situated that the fingers cannot be used easily, Simpson's wire twister answers very well. There are two holes at the end of the shaft. One end of the wire is passed through one hole, the other end through the other hole. The wires are then held on the stretch as the twister is pushed up to the edges of the fistula till they are seen to be close together. Then two or three turns given to the handle twist the ends of the wire together. Sims uses a guard, and twists the wires by forceps. Neugebauer holds the edges together by a pair of fine-toothed forceps, while he twists the wires by a pair of long-handled pliers. But however it is done, the simple suture, tied if of silk or twine, and twisted if of wire, fastened just tight enough to keep the edges in close apposition, is now almost universally adopted, while the clamps of Sims, the button of Bozeman, the wire-splint of Simpson, and other appliances supposed to add to the value of the simple suture, have been generally laid aside as of little or no value, or as even worse than useless.

Before removing the patient to bed it is always advisable to ascertain if the fistula has been perfectly closed, by injecting a few ounces of water into the bladder, and by passing a fine probe between each of the stitches. If a probe passes into the bladder at any point, or if the water escapes from the bladder, one or more additional stitches should be introduced. I feel convinced that inattention to this precaution has been often a

cause of failure. Simpson used milk, as more easily detected than water if a little trickled through any opening.

The Treatment after Operation commences with placing the patient in bed, lying on one side on a water-cushion, with the thighs bent up towards the abdomen. She may change from one side to the other as she desires. Then the chief question is whether a catheter should be left in the bladder, or should be used every two or three hours, or should be dispensed with altogether if the patient is able to pass her urine voluntarily. For some years after the improvements of Sims had been adopted here, the catheter was considered as an essential part of the after-treatment. If the bladder were not kept empty it would distend, the united edges would be pulled apart, urine would dribble between them, and failure ensue; therefore a catheter was kept in the bladder, and it was carefully watched by a nurse to see that it did not become plugged with mucus or deposits from the urine. She was supplied with two, one to use while the other was being cleaned, and she had wire stylets and syringes to clear the channel. Various forms of metallic, elastic, or vulcanite catheters were used, with or without flexible tubing attached. The short curved silver catheter of Sims was that generally preferred. I have had them made extremely light, of aluminium and also of vulcanite, the latter being generally preferred by patients. But objections to the use of the catheter soon arose. Irritation and cramp of the bladder were set up, or the catheter became plugged and the bladder distended, while the constant watching was irksome both to patient and nurse. It was observed that when the catheter had become useless by plugging, or had been carelessly or accidentally removed, a good result was sometimes obtained; and I had expressed my opinion at more than one of our societies and publicly in the hospital, that the use of the catheter was not an essential part of the after-treatment, before I received Simon's elaborate disquisition on the subject. He has brought forward numerous experiments and strong arguments to prove that normal urine is by no means the irritating and injurious fluid it is supposed to be—that it is only when alkaline or putrescent that it becomes acrid or poisonous—and that equally good or better results are obtained in the cure of vaginal fistulæ when no catheter is used in the after-treatment, provided the patient has the power of emptying the bladder, or is only used at intervals of a few hours until the patient regains this power.

I have followed both plans, and have met with success and failure under both; and my present practice is to introduce a small vulcanite catheter, curved like that of Sims's, immediately after the operation, and to leave it as long as the patient does

not complain of it, and no irritation of the bladder is set up; but on either of these signs being observed, the catheter is at once removed, and is either used every two or three hours, or not at all if the patient can empty the bladder without effort. I have twice tried the short catheter of Dr. Dawson, which, from its bulbous extremity, becomes self-retaining, and which admits of the patient moving about while it is worn; but I found it quite as irritating as others, and the patient was kept extremely uncomfortable by the dribbling of urine.

If the patient suffers from pain or restlessness, opium may be given alone or combined with belladonna. A plain nourishing diet is given, and simple diluents may be taken freely.

If the patient is dry, no urine running down from the vagina, it is not advisable to run any risk of disturbing the parts by any examination for six or seven days. Dribbling of urine from the vagina, or profuse muco-purulent discharge, are almost certain signs of failure. If these be shown, it is generally advisable to relieve the patient from her irksome position, and remove the stitches. If all go on well, silk sutures may be removed on the sixth or seventh day; wires may be left till the eighth or tenth, or even longer, if union does not appear to be firm. One great advantage of silk sutures is the ease and safety with which they are removed. Wire is much less easily removed without risk of separating the recently united edges. It is seldom necessary to fix the patient as at the operation. She may be placed in the semi-prone position, and the part exposed by Sims's speculum. Each suture is seized by forceps, is drawn to one side, and divided just where it emerges on the opposite side. The patient should remain two or three days longer in her room, and the catheter may be used occasionally. If the urine is ammoniacal or loaded with mucus, the bladder may be gently washed out with warm water one or twice a day, using a double-current catheter, which is arranged to throw the stream of water over the floor of the bladder.

When the fistula has been of some years' duration it may be some months before the bladder will contain more than a few ounces of urine. But the cure is ultimately complete. In recent cases the patient often recovers complete power over the bladder in a few days after the removal of the sutures, and I have seen this also in some cases of old standing.

When union has not taken place at all, or only partially—in other words, when the operation has failed—two or three courses may be adopted. First, if the ununited edges of the opening, when cleared of urinary deposit, appear to be covered by healthy granulations, the sutures may be at once reapplied, or the granulating surfaces may be held together by *serre-fines*. I have known this to prove successful more than once.

Secondly, if it be undesirable, either from the local condition or general health of the patient, to subject her at once to further confinement in bed, she may be allowed to go about and use some astringent vaginal injection two or three times a day. Tannin dissolved in glycerine and water is perhaps the best. If granulation goes on, the patient may be again placed in bed, and the catheter used, tannin being applied daily to the granulations. This seldom leads to complete closure, but I have seen it occur twice, and one was a very obstinate case of twenty-three years' standing. Thirdly, if neither of these processes appear likely to succeed, the patient should go to the country, and return after some weeks for a repetition of the operation.

The above account may suffice to describe the operation in any ordinary case of vesico-vaginal or recto-vaginal fistula. When the uterus is involved in the injury, and a vesico-utero-vaginal fistula has to be treated, it entirely depends upon the extent of the injury if the opening can or cannot be closed without also closing the os uteri. Sometimes this must be done, the posterior lip of the cervix uteri being united to the neck of the bladder. In this case the woman is rendered sterile, and the menstrual fluid passes into the bladder, and is evacuated with the urine. I have done this three times with complete success, no inconvenience resulting from the unusual course of the menstrual fluid, and the supposed danger of urine passing up along the Fallopian tubes to the peritoneum being purely imaginary. In many cases the anterior lip only of the cervix uteri may be used to close the fistula, leaving the cervical canal free.—*St. Thomas's Hospital Reports*, Vol. 1, 1870, p. 307.

104.—ON THE TREATMENT OF PUERPERAL CONVULSIONS
BY CHLOROFORM AND BARNES'S DILATORS,
WITH NOTES OF A CASE.

By Dr. ALFRED WILTSHIRE, Junior Physician to the West London Hospital, and Physician to the Samaritan and British Lying-in Hospitals.

[How useful chloroform may be in cases of puerperal convulsions, in conjunction with artificial dilatation, the following case shows. In July, Dr. Wiltshire was called by Mr. S., to see with him a young woman, florid and robust looking, who was in labour of her first child. The labour began by convulsions, and during the first seven hours there were fourteen fits.]

I found the patient insensible, with a dusky countenance, and breathing rapidly. Both pulse and respiration were extremely accelerated; the former being 180, the latter 80, per minute. On taking off her stockings I found both legs œdematous. On

examining the head I observed a purulent discharge from the right ear. By the time I had done this a fit commenced. It began on the right side, and, when fully developed there, extended to the left, the whole body being involved in one frightful convulsion.

On examination, per vaginam, the os uteri was found to be dilated to about the size of a florin; the cervix was somewhat unyielding; the membranes were entire; head presenting; uterine contractions frequent. A very small quantity of urine (about 3 j) was withdrawn by means of a catheter. There had been a considerable quantity of water passed in the bed. Some urine subsequently obtained was found to be highly albuminous.

I recommended that chloroform should be exhibited immediately, and that the patient should be kept more or less under its influence continuously. This I advised with a view to checking the fits, which it did efficiently. Then came the question how delivery could best be expedited; that, obviously, being a point of great importance. It was clear that if dilatation of the os uteri were left to the natural efforts, a considerable time must elapse before turning, or the forceps could be resorted to. I therefore advised its rapid dilatation by means of a Barnes's air-bag. This was quickly done, and the labour was forthwith completed by the forceps, a dead child being extracted. The patient had three fits during the night after the withdrawal of the chloroform; regained consciousness next day, and then made a rapid and perfect recovery.

Apart from highly interesting considerations as to the etiology and pathology of the foregoing case, there are two practical points in the treatment of it which are very instructive. The first is that in chloroform we have an agent capable of arresting and keeping in check the convulsions, which of themselves might kill. This, to the obstetric practitioner, is no small boon. To have it in one's power to arrest and avert the hideous convulsions, which are so terrifying to non-professional beholders, is a gain; and still more is it a gain to be able to prevent the exhaustion consequent upon so great a waste of tissue, and the damage which must accrue to the nervous centres from repeated and quickly recurring fits. Moreover, death unquestionably does sometimes occur during a convulsion. On all grounds, therefore, it is important that the fits should be stayed. This (I speak from observation) chloroform will generally enable us to accomplish; meanwhile time is gained for other methods of treatment, with which, as a rule, it need in no way interfere.

The second point is also one of great importance: it has reference to the means whereby labour can be expedited.

Nothing can be more grievous to the medical man than having to wait idly and helplessly by a patient whose safety depends upon the rapid termination of her labour,—a consummation which, however earnestly he may wish it, he may deem himself powerless to promote. Any one who is familiar with the subject, will know how often anxious hours are spent by the medical attendant in watching the progress of a labour, upon the speedy completion of which the safety of his patient and the life of her infant depends. Too often, under such circumstances, uncalled-for, not to say violent and injurious, measures are resorted to, inactivity appearing blameable.

It will, I am sure be no small comfort to those of my professional brethren who may be placed in such a strait, to have within their reach a means of treatment as simple and harmless as that afforded by Dr. Barnes's air-bags. With them there need be no difficulty in rapidly dilating the maternal passages, and in this way the speedy termination of the labour may be secured.—*Practitioner*, Nov. 1870, p. 267.

105.—TREATMENT OF SORE NIPPLES BY NITRATE OF SILVER.

There are few sources of suffering, of an apparently trifling nature, productive of greater misery, than chaps, abrasions, and inflammation of the nipples, in nursing women. For a long time, I tried all the measures usually recommended, both regular and empirical, to cure them; but I never had any reason to congratulate myself on my success. I hear daily of the distress occasioned by such accidents; and having at length fallen on a method of treatment which never fails to give immediate relief, and ultimately to effect a cure, I cannot withhold it longer, lest there be even one practitioner in extensive practice who may be unacquainted with it, and so lose the benefit of a remedy which I regard as a blessing to every woman in the condition before mentioned. Indeed, under my impressions of its value, I should be culpable in not making it known. Many, perhaps, may know it; but there are certainly many who do not, much to the loss of their puerperal and nursing friends and patients; and for the sake of these I may be excused for troubling you. My method is briefly this. Having gently, but carefully, dried the nipple, touch it freely with a sharp pencil of nitrate of silver. Be sure to insinuate the pencil into the chaps or chinks; then wash the nipple with a little warm milk and water. In most instances, the pain, though smart at first, soon subsides, and a little simple ointment, or one made with the flowers of zinc, is all that is requisite to heal the sore. I occasionally wash the nipple with a saturated solution of borax,

before and after suckling the infant. Some suffer a great deal of pain from the application of the caustic; this must not be heeded. A draught, containing an opiate, such as sol. mur. morph. 30 drops, soon brings relief, and the part is presently easier. Some require to be touched more than once,—nay, several times; but each succeeding time it is less painful. I have heard of a solution of nitrate of silver being tried: I can positively assert that it is inferior to the solid caustic, both in relieving and healing these painful affections.—*Journal of Cutaneous Medicine*, June, 1870, p. 68.

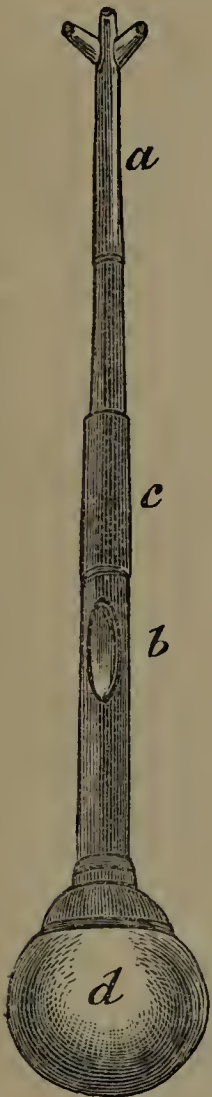
106.—SORE THROAT IN CHILDREN.—AN INSUFFLATOR.

By S. MESSENGER BRADLEY, Esq., Manchester.

During the recent epidemic of sore-throat which prevailed extensively in Manchester and the neighbourhood, I have been in the habit of employing dry powders to the throat instead of gargles; and, I believe, with a more satisfactory result than is derived from the latter.

Children cannot gargle; and some grown-up people even labour under a like disadvantage. Gargles are not brought very thoroughly into contact with the back of the pharynx, which is sometimes the chief, at other times the sole, seat of mischief. Some gargles injure the teeth; others are extremely nauseous; none are saturated solutions, and therefore none are such powerful local astringents as are the drugs themselves in a finely divided form. For these reasons, therefore—for the superior potency of the dry powder, for the increased rapidity of cure which it affords, for the greater accuracy with which the remedy can be localised, and for its universal applicability in cases when local means are indicated—I advocate dry insufflation in preference to the use of gargles.

Whatever powder is selected may be very conveniently applied by means of the instrument which is here engraved. Its use is simple enough, and may be safely entrusted to an intelligent nurse during the absence of the medical man. The powder is introduced into the tube through the aperture *b*, which is then covered with the sliding lid *c*; the tongue of



the patient being depressed, the branched silver end of the tube *a* is passed towards the point against which the powder is to be directed ; and the elastic ball *d*, being compressed by the thumb, the powder is directed with perfect accuracy against the desired spot.

I have employed the following powders and have found most of them useful: alum, rhatany, tannin, catechu, borax, guaia-cum, acetate of lead, calomel, sulphate of copper, nitrate of silver.

The insufflation should be repeated from once to five times a day, according to the severity of the case. If the nitrate of silver, or calomel, or sulphate of copper, be used, from a quarter to half a grain should be mixed with five grains of pearl-powder; in the case of the other drugs, about five grains should be employed at each insufflation.

The instrument is made by Messrs John and William Wood, Manchester.—*British Medical Journal*, June 25, 1870, p. 651.

A D D E N D A .

107.—ON PREVENTION OF DANGER FROM CHLOROFORM.

By Dr. BENJAMIN W. RICHARDSON, F.R.S.

A certain mortality from chloroform admitted, we ask, in considering how to reduce this mortality—Are there any means by which we can lessen the danger of death? The question in general brings before us several questions in particular, which we will take up *seriatim*.

Condition of Patient.—Can unusual danger be predicated from the condition of the patient? This is a point I am constantly consulted upon. But last week I had two cases before me for advice on this one subject. Well, while I dispute altogether the dogma that whenever an operation is justifiable chloroform is justifiable, because there are numbers of useful operations for which it is unjustifiable, I am not prepared to bring any dogmatical rule against chloroform founded on the condition of the patient. Sometimes persons die under chloroform who have no appreciable disease whatever before death—no disease, that is to say, which the most perfect diagnostician could put his finger on and say there was cause of anxiety from the presence of disease. In the only real case of danger I ever had—in the only case where I thought life really was extinct (happily I was wrong)—the patient was one of the most perfect specimens of a healthy body I ever remember to have seen. It was the case of a young lady who had from her birth been in health; she was free from the least affectation. She came under the influence of the narcotic with the utmost ease, the operation—the extraction of a tooth—was skilfully and quickly performed, and a full minute after the chloroform had been withdrawn, the breathing was tranquil, the pulse steady, the countenance natural. Never was a moment when there was less cause for anxiety under the same circumstances; when suddenly there were lighted up all the phenomena of death—the respiration became imperceptible, the heart inaudible, the limbs flaccid. Fortunately, the heart, feeble as it was, continued, and, after three hours of anxious waiting, the recovery was completed. But an hour before I had administered chloroform to an aged lady for a much longer time, and had seen no symptom whatever of danger. The same specimen of chloroform (I mean, of course, a specimen out of

the same bottle) was used, the same mode of administration was followed, the same hand administered; and yet how different the results. They were results which, I think, could not be predicated; they were results which I, at all events, had not the sagacity or knowledge to predict at the time they occurred, in 1860, and which now would be as far from me as ever.

There is a fact I have learned, moreover, in experiment bearing on this same subject, and which deserves notice. I have occasionally had two animals of the same age, breed, and condition in this glass chamber breathing at the same time and for the same time the same atmosphere of chloroform and common air. They have become narcotised by the vapour, and when I have proceeded to remove them I have found one dead and the other alive and apparently free of danger. This is a result which I think could not possibly be foreseen.

We turn from natural to diseased conditions of body, and the difficulties continue. I believe I know of one condition of body which may be diagnosed as specially dangerous for chloroform, and there my knowledge is brought to an end. This unfavourable condition is present when careful diagnosis shows the existence of a weakened and dilated right side of the heart, with enlarged hemorrhoidal veins, varicose veins of the lower extremities, and large, full, yet not tense, veins in the other parts of the body. In the body thus circumstanced we may be certain that the right side of the heart, which is the most important organ to be sustained in action under chloroform, is already half dead, and will readily succumb if subjected to further injury.

Beyond this point of diagnosis I repeat I know nothing definite. When I was engaged in the practice of the administration of chloroform I was careful to make diagnosis of disease before administration of the narcotic, and on referring to the facts I find I administered in the presence of the most extreme forms of organic disease. In phthisis pulmonalis in various stages; in cancer in various stages and types of the malady; in chronic bronchitis, asthma, hydrothorax; in mitral disease, hypertrophy, dilated aorta; in epilepsy, in idiocy with epileptic disease; in various forms of dropsical effusion; in paralysis and acute mania; in some acute diseases, such as croup and pertussis; and in disease of the kidney with albuminous urine. In not one of these administrations has it appeared that the danger of administration was in any sense increased. But my own experiences are small when compared with those which Dr. Snow has written in his book of recorded cases, and he came to the same general conclusion as has been expressed above—a conclusion affirmed, I believe, by all who have become practically conversant with the subject.

Some observations have been made relative to the influence exerted by chloroform on persons of the different sexes and on persons of different ages of life. The evidence in respect to sex is affirmative of no special fact indicating that either sex is subject to peculiar danger, but in the matter of age it has been affirmed that the young are exposed to less danger than the old. It is true that in the lower animals it is easier to resuscitate from apparent death a young than a middle-aged or old animal, and it has been assumed, on the statistics of fatal cases in the human subject, that fewer deaths have been recorded in the young than those more advanced in life. But, for my own part, I am unable to come to any satisfactory conclusion; for I find that young inferior animals are quite as easily killed as older animals, and, respecting the statistics, the evidences are faulty in the main point, inasmuch as no comparison has been made of mortalities in a given number of administrations. When we consider how many more adults and middle-aged and aged persons, massed together, are made to take chloroform than young children, we cannot reason on the subject—in short, a sufficient number of deaths from chloroform have not yet been accurately tabulated to allow of any safe inference to be drawn from them. We may, therefore, leave this question of age and its influence an open question, and wait for further information. Lastly, the effects of mental influence and habit have been considered in relation to the action of chloroform on the body. Snow made a very sound observation on this point which I have often seen proved as true; it is that persons of strong muscle and athletic power are brought under the influence of chloroform with much more difficulty than are persons of weak, sensitive natures, and of refined and highly cultivated minds. It does not, at the same time, follow that the danger in one of these classes of these cases is greater than in the other, for those who come readily under the influence of chloroform are subjected to a smaller dose than the stronger class, and this compensates for what might otherwise be a greater danger.

On the whole the only diagnostic I could give as warning the practitioner from exceptional danger from chloroform, is the diagnostic of dilated and weakened right heart, with the other attendant symptoms already explained. If I have one further misgiving in respect to dangerous cases, it relates to cases of kidney disease with albumen in the urine, and disposition to uræmic sleep. Here, however, the misgiving is based on theoretical reasoning alone, and is greatly negatived by the knowledge we have acquired from practical observation.

Preparation of the Patient.—The state of the patient preparatory to administration admits of being discussed in respect to danger of administration. It may seem childish to insist that

a person under chloroform should enjoy the most perfect muscular freedom so that the breathing may be naturally performed and the circulation left unimpeded. In plain truth it is not childish to enforce these rules, for they are constantly broken. In some operations, as in removal of the jaw, some surgeons still carry out the plan, necessary before the days of anæsthesia, but more than unnecessary now, of binding the upper limbs of the patient to the trunk. In other cases tight clothing is allowed to envelope the trunk of the patient, and frequently many bedclothes are allowed to rest on the abdominal muscles. Further, it is no uncommon practice when, in the second degree of narcotism, the patient struggles, to use force to restrain movement, instead of pushing on the chloroform to the third, quiescent, and much safer degree of narcotism. Now all these proceedings, negligences or practices, are essentially dangerous; they are not trifles. It should be ever remembered that the living body under chloroform is a body more than three parts dead, and that such power as still remains in the organs, all essential to life, is itself so reduced that the smallest untoward circumstance may turn the scale towards death. Perfect freedom for respiratory movement is consequently a vital preparation for the administration of chloroform.

The *position* of the patient has been often dwelt on, and it, too, is important. The sitting position is certainly unfavourable for the heart, and the perfectly recumbent position is unfavourable in many ways. It interferes with free respiratory power, it allows fluids accumulated in the mouth to fall back to the throat, it allows the tongue to fall back, and when vomiting happens to come on it enforces the necessity for raising the body. For all these reasons the semi-recumbent position is the best, as it is the most convenient. To this recommendation as to the position it is essential to add another—viz., to keep the body from the beginning to the end of the administration in the same position without any upward or downward movement. We find in deeply narcotised animals nothing so detrimental as movement of the body. Left at perfect rest, we may narcotise an animal until the inspiratory act of respiration ceases, and yet the animal may recover; but at this crisis the smallest movement, the merest handling of the body, will prevent all chance of return of power. The same rule holds good when an animal is being resuscitated from chloroform; after the first gasp of inspiration proclaims returning life, rest is absolutely essential to successful recovery. Precisely the same rule holds good with the human subject; yet so little is the fact known that when there are symptoms of collapse it is the most common of practices quickly to lift up or quickly to lower the body. The practice seems of little moment; it may be of infinite moment.

In saying this I do not raise objections to the plan of turning the patient once gently over to the left side, as Mr. Bader so strongly recommends, for that I think at first is a good and commendable plan. I speak of the raising and lowering of the body, and the exercise upon it of strong and sudden pressure.

In considering the preparation of the patient for chloroform, a word should be said about *food*. Experience has taught unmistakeably that chloroform should never be administered to a patient whose stomach is charged with food. Persons so circumstanced usually vomit, and, moreover, are readily disposed to become faint. On the other hand, it is very bad practice to administer chloroform to a person exhausted from long deprivation of food. An interval of three hours is sufficient after food, and a longer interval is, I think, injurious if the food last taken be carefully selected. The best food that can be given before administration is, for an adult, a breakfast cup of beef-tea made with Liebig's extract, and charged with grated toast or biscuit. Opinions vary as to the propriety of giving alcohol immediately before administration. If we could put a free quantity of alcohol into the blood before commencing administration, the introduction of the chloroform would be expedited; but the mere act of giving a glass of sherry cannot have any physical influence. The practice is notwithstanding, good in cases where it is required; it is *morally* good, and when a nervous patient asks for it or is pacified by having it offered, a glass of sound wine should never be withheld. Dry sherry is the best wine on these occasions.

I have not yet said all about the preparatory treatment. As it is bad practice to administer chloroform when the stomach is loaded with food, so is it equally bad when the bowels are loaded with fæces, or when they and the stomach are distended with gas. The surgeon should never allow a patient to be put under chloroform without previous inquiry as to the condition of the bowels, or without, if he find them loaded, the administration of a gentle purgative. A few grains of grey powder and scammony, followed by an aloetic draught, a day previous to the administration of chloroform is a most valuable preparative for those in whom the diaphragm is impeded in its free action by constipation and flatulent oppression.—*Medical Times and Gazette*, May 14, 1870, p. 518.

108.—ON DEATH FROM CHLOROFORM.

By Dr. BENJAMIN W. RICHARDSON, F.R.S.

[The question of the best mode of administration of chloroform has, since its discovery, been a fertile source of controversy.

Sir James Simpson from first to last reasoned against complicated methods of administration, whilst, on the other hand, the idea of Dr. Snow was, that, given a perfect instrument for inhalation no deaths ought to occur. He considered that the inspired air ought not to contain above four or five per cent. of chloroform, this being quite sufficient to produce perfect anæsthesia. Against this it may be said that in practice this amount of dilution of chloroform vapour has not been found to insure absolute immunity from danger.]

The most extreme successes have attended administrations which have been conducted without the assistance of any method for measuring per centage of chloroform. In the seventeen thousand cases I have recorded as occurring before a death was chronicled, the mode of administration was as varied as could well be imagined. Suppose, however, one particular instrument or method had been alone employed in this number of cases, what would have been said of it? It would have been raised to an estimate as priceless as fabulous. In two of the largest Hospitals of the United Kingdom there is no record of a death from chloroform, and yet in neither of these institutions has an apparatus for the measurement of chloroform been employed. On the whole, were I inclined to follow up the question sharply, I might urge, on fair evidence, that there have been more deaths from chloroform in cases where an apparatus for adjusting the quantity of chloroform has been used, than in other cases; but this again would be false to nature, as implying that proportion of deaths bears some relation to mode of administration. We will therefore pass on our way, content to know that the natural facts dispel the illusion that in any particular known method there is special security from death.

Can we then by any reasonable hypothesis explain, apart from method, the cause of the many and frequent deaths from chloroform? There seems to me a most reasonable hypothesis which does account for the facts. The hypothesis is simple: it is that in every case where a person has to be made so dead to the outer world that he neither sees, nor hears, nor thinks, nor feels, but hangs on to the mere thread of involuntary organic function and action, he is dead in every part except in the mere parts which remain true to involuntary organic work, and that as in all persons, these necessary parts are not equally sound, therefore some persons succumb. If this be true it is not on the per centage of chloroform inhaled that either safety or danger in a given number of cases of administration rests, but on the per centage of organically sound or unsound persons who are subjected in a given number of cases to the vapour of chloroform.

Still there remains one other consideration. It is acknowledged to be necessary for an operation to induce such a degree of insensibility as shall constitute perfect anæsthesia, and it is very near to the exact truth to assume that to produce this degree a certain given quantity of chloroform must enter the body whether it enter quickly or slowly. We ought to consider, therefore, whether it be safest to introduce what is required quickly or slowly. There is no possible experience on the human subject that can be to us the poorest guide on the particular question here raised. But on inferior animals we can study the question with precision, and without subjecting them to pain can arrive at a very satisfactory result. I have studied by this method, and will put before you the facts under two or three heads.

First, then, I find, and I will demonstrate the fact by experiment at a later period, that a warm-blooded animal subjected suddenly to vapour of chloroform at a temperature over 70° Fahr. will often cease to breathe and to circulate blood, at once; will die as if from sudden apnœal syncope. I think we now know what, in these cases, is the cause of death. It is not from the absorption of vapour of chloroform into the blood. No! it is from the direct action of the vapour on the nervous system. The stimulation excited by the vapour causes the animal spasmodically to cease to breathe, then follows the apnœa and arrest of the action of the heart.

Dr. Rutherford in his most able and suggestive paper, in the *Journal of Anatomy and Physiology*, for May, 1869, "On the Influence of the Vagus on the Vascular System," touches on this subject incidentally, but not less forcibly. He remarks, "if any irritating vapour be brought before the nose of a rabbit, it instantly closes its nostrils and ceases to breathe, often for thirty to forty seconds. Within three seconds after the cessation of respiration, the heart comes almost to a standstill, and continues to beat very slowly until respiration be re-established. The arrest of the heart is due to stimulation of the inferior branch of the vagus by the asphyxiated condition of the blood, for the slowing of the heart does not set in until death approach, if the vagi have been previously divided."

Dr. Rutherford's explanation of the arrest of respiratory and circulatory action, under the circumstances named, leaves, as it seems to me, nothing to be desired, and, as I have said, animals (I refer to rabbits specially) sometimes die straight off from this sudden arrest of action of the respiration and circulation.

Have we in the human subject the analogous mode of death? Distinctly. In Snow's table of fifty fatal cases, it is recorded that nine of the patients died within the minute after the commencement of inhalation, and four of these within a few seconds.

Various opinions have been adduced to account for such rapid deaths. Some have urged that the deaths are from fear; others, that they are from rapid absorption of the chloroform. The explanation seems simple enough on physiological grounds. The patients have died from the direct action of the vapour on the nervous periphery of the breathing surfaces; they spasmodically ceased to breathe, and the vagus being stimulated by the asphyxiated blood, the heart also ceased to circulate blood. In this same way persons have undoubtedly died under the influence of sudden fear.

The moral of this point is of deep interest, and has at least two meanings. It tells us that chloroform, being a direct irritant, is, in that sense alone, an objectionable narcotic vapour, and it tells us further that it is a bad practice to commence its inhalation too abruptly, or to force on narcotism *rudely* against time. The same observation extends to other agents than chloroform—it extends to all bodies of the same family. Chloride of methyl and bichloride of methylene also act as direct irritants, and are also dangerous when used against time. At this moment there is, nevertheless, a practice of producing instant anæsthesia for short operations by the rapid pushing of bichloride of methylene, so that the patient is made insensible in twenty or thirty seconds. There has as yet been no death from this method, but I am bound to say that an occasional death from it is simply inevitable. One day a frightened woman or an irritable nervous man will take a few inhalations of the vapour, will hold the breath until the heart stops, and will die. And pray observe the truth, that in this form of death it is not the quantity of vapour actually condensed in the blood that kills; the killing is by a primary impression on the peripheral nervous surface from the vapour, and by a secondary excitation of the vagus and arrest of the action of the heart from asphyxia of the blood.

On the whole it is a bad, and likely to be a fatal, practice, to push on narcotism by chloroform against time. In the cases of scared women, feeble children, and irritable and resistant persons of both sexes, the danger of administration is always present until the mind is assured if it be faltering, or tranquillised if it be excitable.

Bearing still on rapid death from chloroform is another observation worthy of notice—viz., that if the lungs be suddenly charged with chloroform vapour, there is induced often a quick contraction of the pulmonary arterial vessels. The lungs under these circumstances appear suddenly blanched as snow, and the right heart is instantly paralysed from pressure of blood which continues to flow into it, but which cannot be forced into the pulmonary circuit. In these cases there may be one or two

efforts at respiration even after the action of the heart seems to have ceased; but when the body is laid open and the heart is exposed to the air there is always some after-action of the auricle and ventricle from absorption of oxygen by the contained blood and renewal of muscular irritability. There are many cases on record of death in the human subject where the facts point definitely to this mode of death, and, again, suggest the impropriety of narcotising by violence of administration.

We want to know, lastly, in respect to rapid death from chloroform, whether the vapour ever acts directly and primarily upon the heart itself, through the lungs. In investigating this point I have never been able to satisfy myself that in an animal with a perfectly healthy heart, the heart can be arrested in its function by the vapour of chloroform administered through the respiratory surface in any other ways than those described immediately above. At the same time, it admits of the readiest demonstration that the heart may be instantaneously arrested in its motion if chloroform be brought into it directly by the blood. To prove this we have to inject with the hypodermic syringe a few minims of chloroform—ten may suffice—into a vein of a full-sized rabbit. Within a second or two there is death from instant and perfect arrest of the action of the heart. If we now lay open the thorax we find the heart on both sides firmly contracted on firmly clotted blood which fills all the cavities, while the lungs are intensely congested also with clotted blood. If, further, we try the irritability of the muscles with the galvanic current, we find the heart absolutely dead, while all the other muscles of the body respond vigorously to the stimulus, and continue so to respond, it may be, for an hour. In this case the heart receives immediately the fatal dose, and the death is due to the contraction excited by the stimulant. We understand here every step of the process. We follow the chloroform into the right side, over with the pulmonary stream into the left auricle and ventricle, and from the left ventricle into the coronary system of the heart itself, there to excite the cardiac muscular spasm which leads to the irremediable death. Still by this experiment we prove only that the heart is fatally influenced when a large quantity of chloroform is thrown into it through the blood, and we have it still an open question whether the same arrest of the cardiac action will take place when the vapour of chloroform is carried to the heart through the lungs, by inhalation. Twenty years ago it was assumed that in nearly every fatal case death was owing to cessation of the heart, and we are indebted to Dr. Sibson for a very acute and admirable suggestion explaining the cause of the suddenness of the death. The heart, said he in effect, for I forget his exact words, first feeds itself with blood by its coronary system

of vessels. It receives, therefore, into itself the first impression of every stroke of itself. If the blood with which it is fed is normal, it is first fed by it; if the blood is abnormal, it is first injured by it; and so when the blood of the left side is charged with chloroform the heart is the organ primarily influenced by the agent. In inspiring vapour of chloroform what, then, do we do? We bring the vapour over an immense surface exposed to blood; there it is condensed, there it commingles with the arterialised blood as condensed, and from thence it travels direct through the left cavities into the structure of the heart. The process is much the same as that of direct introduction through a vein, but yet I cannot in any case, in a healthy animal, bring the heart to a standstill in the same way through the lungs. I always find that as the quantity of vapour is increased the introduction of it into the blood is impeded by the direct action exerted upon the pulmonary vessels. In plain matter of fact, I doubt whether it be possible to kill the perfectly healthy heart by the direct action of a poisonous amount of chloroform introduced into its substance through the respiratory surface. But I will not say the same of a heart that is not healthy, nor of a heart in which the nervous mechanism is injured, the muscular substance appearing healthy. Such a heart might possibly succumb under a dose of chloroform small enough to pass through the pulmonary vessels without exciting contraction in them, and small enough not to produce anæsthesia.

A third series of facts, learned from direct experience in narcotising inferior animals, relates to the inquiry whether, if the idea of narcotising at once and, as we may say, by violence, be given up, it is best to begin with gentleness and to continue slowly, or to begin gently, and, having subdued the preliminary excitement, to push on the inhalation more rapidly. Some administrators give the vapour so cautiously that they rarely have the patient ready for the knife under six or seven minutes. Others carry on the administration quickly through the second and bring the patient into the third degree in from four to five minutes. Snow's rule was two minutes for infants, three for children, and four or five for adults. The rule is a sound one, as is another rule from the same author, that when the second stage of excitement is vehement, it is best subdued by carrying on the inhalation firmly and resolutely. In animals, I find that when the first stage is over, it is always safer practice to narcotise quickly to the third stage than to go on slowly saturating the body with the vapour, and rendering any accident which might be casual fatal. For the fact cannot be too strongly impressed on slow and overcautious administrators that when an animal body is being charged for a long time with chloro-

form the whole of the substance introduced is not utilised in producing anæsthesia. Some of it is eliminated into the alimentary canal, some is stored up in the liver, some in the cellular tissue, some in the muscular fibre, in all of which parts, as you know, we can detect it chemically. Excess, therefore, is so much dangerous excess; if any organ fail while the excess is present the act of withdrawing the chloroform from the breathing is of no avail, for there is a steady reabsorption into the circulation, from the body, and the narcotic effect is sustained. Some perfect illustrations of the influence of moderately short as compared with long administration have occurred in my experiments for the resuscitation of animals that have ceased to breathe under chloroform vapour, and I can determine, by method of administration, whether an animal shall be recoverable or not after respiration has ceased. If the animal shall have ceased to breathe within four minutes I can insure, in five cases out of six, to resuscitate at a temperature between 50° and 60°. But if an animal remain even in less vapour, for seven minutes, before respiration ceases, I cannot insure recovery in more cases than one in six.

The lesson taught by this series of facts is then not to induce slow narcosis: but having carefully felt the way in the first minute or two of administration, in the adult, to push quickly into the third degree in which, if the body be not surcharged with chloroform, the danger is comparatively small.

Attempts have been made to modify the effects of chloroform, and to render it safer for administration by mixing it with other fluids. Chloric ether (a mixture of chloroform in alcohol) was used, at the suggestion of the late Jacob Bell, before chloroform was introduced at all as an anæsthetic; and so soon as chloroform came into common use, it was tried in various forms of admixture. Ether and chloroform; alcohol and chloroform; alcohol, ether, and chloroform have been combined and applied with varying success. The Vienna mixture, which was composed of one part chloroform and six of absolute ether, has been the most extensively used of all these compounds, and I believe it to be the best. At the request of Mr. Wells, I once administered the Vienna mixture, while he removed the upper jaw from an adult person; and once again while he performed the operation of ovariectomy. I have also used it many times for minor operations, and compared it with other mixtures over which it seemed to me to have advantages. But after all, I could see no possible advantage in this or other mixtures over the simple agent. Snow was early to point out that, when we employ a mixture of ether and chloroform, we produce narcotism with the lighter ether and keep it up with the chloroform, so that there is a mixed effect, and this is essentially true of all

mixtures that have been constructed. Let me put on the board the physical properties of the three agents chloroform, ethylic ether, and ethylic alcohol, and you will see how different they are and how improbable, I had almost said impossible, it is that they should act together; that is to say, that they should at the same temperature evaporate uniformly and equally, diffuse uniformly and equally in the air, and condense uniformly and equally in the blood.

	Specific gravity. Water = 1000.	Vapour density. Air = 1.	Boiling point.
Chloroform . .	1.491	4.141	142° Fahr.
Ethylic ether .	0.720	2.586	95° Fahr.
Ethylic alcohol	0.793	1.613	173° Fahr.

We cannot look for a moment at these simple facts without seeing how puerile it is to expect uniformity of result from the evaporation and diffusion at the same temperature of bodies so physically different and only mechanically admixed. In evaporation the three agents split up into their three distinct vapours, each expanding its own natural way, diffusing its own way, condensing its own way, and, what is more, each playing its own natural part in physiological action. To sum up, when we mix chloroform with another agent, we weaken it as if we diluted it in air to reduce its effect, so that the question of mixtures bring us back to the previous question of quick or slow narcotism, which has already been discussed.

If it were possible to get two fluids which were near to each other in physical characters, we should in a mixture of them obtain a compound on which to base a scientific research on the effects of admixture. We might take bichloride of methylene and ethylic ether for this purpose, as will be seen when the two agents are compared.

	Specific gravity. Water = 1000.	Vapour density. Air = 1.	Boiling point.
Bichloride of methylene	1.344	2.937	104° Fahr.
Ethylic ether	5.720	2.586	95° Fahr.

And I could offer other combinations which are nearer than these in relation to physical constitution. Now such analogous bodies, I admit, deserve to be studied in action alone and in combination, for one of them might be discovered to produce physiological effects corrective of dangerous faults in the other, and a grand result might be obtained. But the empirical method of mixing fluids of different qualities for the assumed purpose of obtaining uniformity and safety of action partakes of the philosophy of the hospital patient, who partook in one dose of a small quantity of each fellow patient's medicine. As

a serious proposition it indicates a scientific coupling, in which love for something new dallies hopelessly with idleness for research.

In conclusion, reviewing the past of chloroform as an anæsthetic from its introduction until now, I see nothing to lead me to assume that any of the deaths which have followed the administration have been due either to absence of skill on the part of administrators, want of special knowledge respecting special apparatus, or absence of special mixtures of chloroform with other fluids. I see nothing, again, in bad quality of specimens of chloroform to account for the fatality which has followed its use. Lastly, I see nothing in operative surgery (except that there *seem* to have been more deaths from the vapour when it has been used for minor than for major operations), to account for the fatality. All through the chapter one administrator appears to have been as skilful and as thoughtful as another, one quality of chloroform as good as another, one operator as careful as another. I can find no single death from chloroform in which even a pretext of a charge could be raised against these factors in the catastrophe. We must therefore look for the cause of death in some inherent fault in chloroform itself, which unfits it for every person indiscriminately; or, putting it the other way, in some inherent fault in the organisms of certain who die, which renders them unfitted to meet the physiological changes the chloroform excites when it is introduced into the organism.

[In another paper Dr. Richardson considers—1. The modes of death of this agent. 2. The cause of death. 3. The means to be employed in attempting resuscitation when life seems to have ceased under the influence of vapour of chloroform.]

Modes of Death.—There are four modes of death from chloroform. The first may be called by *syncopal apnœa*. The death by this mode is very rapid, occurring within the minute after the commencement of inhalation. The action of the vapour in this mode of death is, as I have explained in a former lecture, by the immediate influence exerted by it on the peripheral nervous system. By this action respiration is for an interval suspended, there is accumulation of carbonic acid in the blood, irritation of the vagus, and arrest—from the irritation—of the action of the heart.

We can illustrate this mode of death with certainty in the inferior animal. We take a glass chamber and charge it freely with vapour of chloroform at a temperature of 75° ; at least 15 per cent. of the vapour should be present. Into the chamber we introduce any small warm-blooded animal, and in the matter of three or four seconds it ceases to breathe. There are

present the signs of commencing apnœa—lividity, coldness, insensibility. These signs just appear and then the heart stops, and if nothing be done to restore life, death is complete. When we open the body after this form of death, we find the heart containing blood on both sides, but paralysed for the moment completely; we find the lungs containing blood in the pulmonary circuit and yet not congested with blood; we find when we test the muscles with the electric current that they contract readily and that they preserve their power of contraction for a long time, half an hour at least, under stimulus, if they be not exhausted by the stimulus itself; lastly, and let this fact never be forgotten, the heart, although paralysed within the body, is not irrevocably dead: we expose it to air by opening the pericardium, and as the blood in the right auricle absorbs oxygen and brightens in colour, the auricle recommences to contract, the ventricle follows rhythmically, and in time all the motion of the organ is restored.

The human subject sinks, as we know, from this mode of death under chloroform, and we can understand now the kind of subject that is most likely to succumb in the manner described. It will be the young or feeble subject, or the irritable, nervous, shrinking subject: such a one as would be likely to faint under sudden shock or alarm; or it will be the vehement resisting subject—one who, excited by the first impression of the vapour, would grow violent under coercion or restraint while made to inhale the vapour. A remark by Dr. Sansom occurs to me here. He observes that persons who are in health and are about to be subjected to some minor operation are put under chloroform with more difficulty than are those who, by long illness and suffering, are resigned to their fate, and who, prepared to meet the worst, have, to some extent, lost the sense of fear. Few better observations of a practical kind were ever made than this, and it applies with singular force to the mode of death now under consideration.

I cannot, while treating of this rapid mode of death, avoid saying a word against the promotion of it by an error in administration of chloroform which may be called a moral error—an error most reprehensible, cruel, insane, and yet not uncommon. This is the error: to bring a patient just prior to the performance of an operation, when the anxiety which weakens the strongest man or woman is filling the mind—to bring the patient thus circumstanced, with all the senses open, into the presence of an assembly of practitioners and students and commence without any preparation or soothing, quieting, expression, the administration of the narcotic vapour. It is not a wonder that some sick persons die under this ordeal; the wonder is that so many survive it. To bring a living intelli-

gent human being to the borderland of life by any narcotic is not a fool's errand for mankind, but a solemn service, and I think in all cases of death from narcotic gases and vapours this point relative to administration is one on which a coroner might make due inquiry, with advantage to the profession not less than to the community.

The second mode of death may be called death from muscular excitability—*epileptiform syncope*. It occurs during the second stage of narcotism—the rigid stage, as it has been designated. In this stage the chloroform is acting as an excitant to the whole muscular system through the blood, which conveys it over the organism, and in this excitement the involuntary as well as the voluntary muscular fibres share. Efforts to vomit not unfrequently precede death when it occurs during this period of administration, and the death if it happen is instant, and by pure and simple syncope. If we could suddenly empty the whole arterial system of blood, a more perfect syncope could scarcely be induced, and in fact the emptying of the arterial system is what really takes place; for if we open the body of an inferior animal immediately after the death, we find the left side of the heart with the arteries empty, and the lungs themselves entirely blanched and bloodless; bloodless as if they had been washed with water by injection. I have shown this condition, as you will remember, many times. When again we turn to the structure of the brain, we find it in the same blanched and bloodless state. All through the body, in short, there is evidence afforded, on the arterial side of the circulation, of intense arterial contraction. The venous side tells in another way the same story; for the right side of the heart is engorged with blood, the veins are engorged, the sinuses are engorged, the arteries have poured their contents into the veins, and contracting firmly in their minute ramifications have shut up the blood in the veins, and produced complete arrest of motion throughout the circulation. Considering how commonly and how severely the second stage or degree of narcotism under chloroform is developed, it is a matter of wonder that death is not more frequent during this stage. Happily, if the vapour is administered steadily and freely, the stage of excitement is comparatively short, and, happily also, when the next or third degree of narcotism is reached, the danger of continued muscular rigidity is past. When death occurs in the second degree of narcotism from chloroform, the rigidity of muscle alternates with relaxation, the result being a convulsive effort resembling true epilepsy. The first death from chloroform, in the case of Hannah Greener, was of this nature.

Why in exceptional cases death should occur during the stage of muscular excitement, while so many persons pass through

the ordeal of that stage unscathed, I cannot readily answer. The cause of death is excessive irritation of the sympathetic nervous system, and it is fair to assume that any previously deranged condition of that system would be a reason for the danger. Any pre-existing irritation of the stomach or of the intestinal surface would be a predisposing cause of danger, as would prolonged emotional excitement and hysteria. The fatal accident might happen, when the excitement is extreme, from indecision on the part of the administrator as to whether he should stop the administration altogether, or push it on to the production of the third degree. In the inferior animals, death during the stage of excitement is readily induced by more prolongation of the second stage, and what is true in respect to the lower animals is, I think, equally true in respect to man.

The third mode of death from chloroform is one in which from the slow and continued action of the narcotic, there is *paralysis of the heart*, with apparent paralysis of the muscular system generally. If we take a perfectly healthy animal, narcotise it carefully, and bring it into what was called by Snow the fourth stage, or the stage of complete muscular relaxation, we shall have led the animal up to the border of death; if we then carry our narcotism a little further, the heart and the respiration will cease together, but before the heart shall cease it will give us intimation it is about to stop by one important sign, it will give an *intermittent* stroke. See, here are two animals in the profound and all but fatal fourth degree of narcotic sleep. One animal is a pigeon, the other a rabbit. We remove the bird from the vapour, and observe how complete is the muscular relaxation; we listen to its heart and hear how distinctly that organ is proclaiming, by its intermittent pulsation, the imminent approach to the cessation of its labours. It is like a stopping watch, which gives a few ticks, then waits, then goes on again. But now that the vapour is no longer being inhaled, and that the oxidation is unimpeded, the recovery of the animal is certain. We will let the other animal remain in the vapour and soon it ceases, but almost imperceptibly ceases, to breathe and to circulate blood. We say it is dead, and so it is, but this I would point out, it is not equally dead throughout its body. Its voluntary muscles respond to galvanism, the respiratory muscles respond, but when we expose the heart and subject it to the galvanic stimulus it is absolutely dead.

This mode of death from chloroform would very often happen if in every operation it were necessary to carry the insensibility to the fourth degree. Fortunately this is not the case, for under chloroform the consciousness fails before the failure of the muscular power, and when there is unconsciousness we can in most

cases proceed to operation at once ; thus we rarely run the risk of the extreme degree of narcotism, or if we reach it we withdraw the vapour ; and, the subject before us being healthy, we secure the recovery, in the same way as we have secured it in the bird which has been narcotised to-day.

The fourth mode of death is a compound death ; there are in it two factors, *depression from chloroform, and surgical shock*. The combination may be in two or three ways. In a few instances of death hemorrhage has brought to a fatal degree a depression which had commenced during and from the administration of chloroform. The death here is by syncope, and is often sudden. In other cases the patient has not been fully narcotised, and in a half unconscious state feeling the pain of the operation has become faint and died from syncope. In this case again the death is sudden. Dr. Marshall, of Mortlake, has particularly directed my attention to this mode of death, and has dwelt, I think, with force and truth on the errors sometimes committed, first in supposing, in the case of small operations, that it is only necessary to administer a little narcotic vapour, and, secondly, in proceeding to operate while the patient is excited and not insensible. There have been several deaths at this juncture of the first step of an operation during the first degree of narcotism. Finally, under very deep narcotism, carried near to or into the fourth degree of insensibility, death may take place from severity of shock, incident to operative procedure. I have noticed always in administering an anæsthetic to deep anæsthesia during the performance of the operation of ovariectomy that when the operator first puts his hand into the peritoneum, or when he uses the sponge to clear out the abdominal cavity, there is an alteration in the beat of the heart, a quickness of beat with feebleness, and even with intermittency. I remember also a case where in order to break up firm adhesions in the knee-joint, I administered chloroform to a lady to the degree of complete muscular prostration, while Mr. William Adams made sharp and forcible bending of the joint. With each act of the operator in this case, the pulse stopped for the moment as if it had been mechanically arrested, and then after a pause recommenced its beat. It was necessary on three separate occasions to perform the operation thus named, and on each occasion the phenomenon described was equally well marked.

The case of death under chloroform, which recently occurred in Scotland, when Sir James Simpson administered the vapour, was, I conceive, an instance in which the fatal termination was due to the combination of narcotism and surgical shock.

Cause of Death.—When we have clearly before us the modes of death from chloroform, we are led the more readily to see the

immediate cause of death, and in this survey we strengthen our view if we combine with mode of death the phenomena which naturally accompany ordinary narcotism under chloroform.

In the first stage of administration, the effect of the vapour is upon the peripheral nervous surface and the cerebral centres. In both there is excitation, and very early the cerebral centres lose their natural condition, becoming suspended in function. Following immediately upon this, the cord, the sympathetic system, and the true nervous system of the heart, become excited. Thirdly, the nervous excitation generally ceases, and there follows calmness, or even depression of action, and if the administration be continued the medulla fails, the sympathetic fails, the cardiac nervous centres fail. This, then, is the natural order of death of each part—Brain, cord, sympathetic centres, cardiac centres.

It does not appear that the act of producing cerebral unconsciousness is ever a cause of danger to life, and, except in cases where the vapour is too irritating, we have little evidence to show that during the administration of chloroform there is any primary risk from injury done to the centres of the nervous system that govern respiration. The danger really commences when the vagus, or the organic nervous centres, or both, become implicated, for then the contractile elements of the vascular system are at once modified in function. Wonderful light has been thrown on cardiac action during the last few years, and no subject does that light more illuminate than this we have now specially in hand. In his excellent paper, to which I referred at the last lecture, Dr. Rutherford sustains the modern theory, "that the contractile elements of the entire vascular system are presided over by two kinds of nerves, one motor, the other inhibitory," the motor bringing about "contraction," the inhibitory throwing "the motor nerves and contractile elements into a state of rest." The term "inhibitory" is, I fear, unfortunate as conveying the idea of an active process, which is not such, but is a mere passiveness. I will not at this moment, however, quarrel with a term, since it is more important to treat of the theory in relation to the action of chloroform, and the theory tells us simply that if the vagus be subjected to irritation the motion of the heart is arrested quickly, but that after a time it may recommence to beat even when the excitation is continued; that paralysis or division of the vagus increases for a time the speed of the heart; that the two cardiac nervous centres with branches from the sympathetic are the real motor nerves of the heart, and that between the two sets of nerves, the inferior cardiac branches of the vagi and the motor centres, there is a balance of action.

In all the modes of death from chloroform we see a fatal dis-

turbance of this balance. In the first mode—by syncopal apnoea—we see the direct action (inhibitory it is called) of the pneumogastric upon the heart; in the second mode—by epileptiform syncope—we see the direct effect of excitation of the centres which supply the motor or contractile elements of the vascular system; in the third mode—by failure of muscular motion—we see the effect of the poisonous agent upon the motor system carried to paralysis; and in the fourth, when surgical shock combines with depression from chloroform, we see direct paralysing action both on the sympathetic and pneumogastric.

After death by chloroform it is the common practice to report on the condition of the heart of the patient. Thus sometimes the heart is said to have undergone fatty degeneration, at other times to be thin, and again to be quite healthy, so that from the many and different reports in different fatal cases respecting the condition of the heart no rule can be deduced which the morbid anatomist can accept as explanatory of death, or on which, in other cases, the diagnostician can rely as indicating danger of death. In this there is nothing remarkable. Let us bear in our minds the truth that chloroform, when it kills, kills not necessarily by its action on the muscular structure of the heart, but by its influence on the nervous mechanism of the heart, and then the actual condition of the muscular structure becomes secondary in estimation.

In conclusion, I infer that in every case of death from chloroform the cause of death is excitation either of the motor or of the controlling nervous mechanism of the heart. I conceive that any primary organic changes of structure leading to death are situated in that mechanism, and must be looked for there; and I think there is fair ground to assume that in some cases there may be death where there is no actual disease of structure, but simply so extreme a natural delicacy of balance between the nervous functions that the excitation produced by the chloroform is sufficient to arrest motion and to destroy life.

On Resuscitation when Life seems to have ceased under Chloroform.—When, unhappily, death takes place in the human subject from the inhalation of chloroform, there is usually a rush of attempts to call back the lost life. One observer would flip the motionless body with a towel, or briskly rub the limbs; another would try galvanism; a third would commence artificial respiration; a fourth would combine every method. In a few cases there have been recoveries from seeming death during the application of some particular plan; thereupon, that plan has been vaunted as *the* plan, it has been tried again, and has not succeeded, and then it is urged that, in the case where it seemed to succeed, it was merely coincident with natural recovery.

On the whole, nothing whatever has been learned from the human subject as to the best procedure after apparent death from chloroform, nor is it likely that anything can be learnt in this manner. In the first place, fortunately no individual man can attain a sufficient experience from the human subject for systematic guidance; secondly, a research made for the mere sake of research on the human subject accidentally destroyed by chloroform would be unjustifiable; and thirdly, the excitement and anxiety of attendants on those who die is so intense, that no rigorous observation or criticism of treatment can be carried out. We have, therefore, to learn all that is to be learned from the inferior animal, and in this way we can learn with hope for the future, and with soundness of observation at the time; we can repeat observation on observation; we can prove what is injurious in treatment; we can note down what is useful, we can confirm what is real. In this research, moreover, while the object we have in view is one of the greatest and most humane that can occupy the human intellect, it can be carried out without inflicting on the inferior animal world any trace of suffering. The animals simply sleep as we do when we inhale the narcotic vapour.

This, therefore, has been the inquiry pursued here in respect to methods of recovering from death by chloroform and I may say at once that much has been learned that can be demonstrated as usual.

There are two methods deserving consideration in respect to resuscitation—one may be called the natural, the other the antidotal method. By the first we aim to sustain the organic functions so effectively that the poisonous vapour may be lifted out of the system, and the organic functions be therewith restored. By the second we aim to neutralise the poison, or to counteract its effect, by the employment of some opposing agent or principle.

In pursuit of the natural method I have studied many plans—artificial respiration, electrical excitation, artificial circulation, transfusion. For full particulars of these researches I must refer you to my papers in the Proceedings of the Royal Society and in the Medico-Chirurgical Review, for July, 1862. For the present moment I confine myself to two of these methods alone—artificial respiration and electrical excitation. These are the two methods best known and most commonly used; and if I define clearly their values I shall not only leave some practical facts on the mind, but shall lead up to future advances towards more accurate knowledge and experience.

On the human subject artificial respiration is followed out simply in order to imitate natural respiration; while galvanism is followed, in a less definite manner, by some to excite respi-

ration, by others to excite the heart, occasionally for neither of these reasons, or for both. In my researches I have used artificial respiration for the same simple purpose as it is used on the human subject, striving only to make it perfect; while I have used galvanism for three distinct purposes: First, to excite and sustain respiration; second, to excite and sustain the heart and respiration; third, to excite the heart while the respiratory process was sustained by artificial respiration.

You will ask, immediately:—Can anything be done? I answer immediately:—Yes. I answer that in some cases where death from chloroform appears to be perfect—where if nothing were done, the animal would be dead—life can be restored; can be restored with certainty in a given number of cases out of a given number of deaths—in one case out of three, I may venture to say without fear of saying more than is true. We find at the same time that the result is not the same after each mode of death. It is most easy after the first mode, less easy after the second, and rarely possible after the third. I have not tried it after the fourth, but I should infer that it would be nearly the same as after the first mode. What is more—and the fact is as singular as it is obvious—the restoration of life is much more easy during cold and cool than it is during hot weather. When the temperature of the day is between 70° and 80° Fahr. the experiment usually fails. Lastly, the experiment usually fails if the chloroform be administered for several minutes before the narcotism passes into death.

The plan for restoration which, up to this time, succeeds, and the only one which succeeds, is that of careful, delicate, but at the same time steady artificial respiration by the double acting bellows, which I have already described.* So soon as respiration and the other evidences of life have ceased, we insert the exit tube of the bellows into the nostril and empty the lung by a stroke of the bellows on the emptying side; then we gently inflate, and next empty and fill in alternate stroke. Let us proceed to demonstration. We put a large well nourished rabbit gently to sleep with vapour of chloroform, we carry on the administration quickly, and, as you see, at the end of four minutes the animal has ceased to breathe. We may let it lie in this way a full minute, but we must not move it or handle it. The least pressure with the hand on its thorax or abdomen, or the lifting it up quickly, would be fatal to success. Now we introduce the nostril tubes of the bellows and first

* The double acting bellows were described in the lecture on artificial respiration, published in the last volume of the *Medical Times and Gazette*. The bellows are made by Messrs. Krohne and Seseman, of 8, Duke-street, Manchester-square, whom I have much pleasure in thanking for the intelligent pains they have taken in carrying out my design. The bellows are inexpensive, and are useful for other purposes than artificial respiration. [*Retrospect*, vol. lxi., p. 90.]

exhaust the chest, then fill, and in the end exhaust and fill steadily some twenty to twenty-five times a minute. We must wait patiently for three or four minutes, keeping up the respiration before we can expect a result; and while we wait let me narrate this peculiarly interesting circumstance, that in proportion to the time allowed to elapse between the death and the restorative process, so must time be allowed for continuing the artificial respiration. If the animal die at once and the artificial respiration be commenced at once, one or two strokes of the bellows are often sufficient to restore independent life; but when, as in the present case, the time is long before respiration is artificially set up, then some moments must be allowed for recovery. Why is this? It is because the respiratory muscles and their nervous centres must be recharged with blood before they can take on their action again, a slow process when the motion of the heart is all but extinguished.

We persevere, and now observe we are about to be rewarded with success; if you watch closely you will perceive a tremulous muscular movement in the flank of the animal; it is followed by an inspiratory effect. The muscles are now recharged with blood, and the organic nervous centres are recharged, and this effected, I know, by experience, I have done enough. I remove the little tube from the nostril and let the recovery be completed by natural respiration. The animal will in time awake as if nothing had happened to it.* Was the animal in this case dead? It was practically, it was not actually. The brain was dead, the cord was dead, the voluntary muscles were under no stimulus; the semi-voluntary muscles were under no stimulus; but there was one organ, which though we could not discern its motion was in feeble action; and that organ was the heart. By our gentle manipulation we restored the heart; it recharged itself, it slowly recharged the other muscles and the nervous centres with blood, and at last there was natural action. The experiment is so easy to perform, so uncomplicated, it would appear as if it ought always to succeed; and it would always succeed if we knew a little more. But at present we only know certain causes of failure, of which there are several. Sometimes we fail because the system is too fully charged with chloroform; sometimes because the column of blood from the right to the left side of the heart is broken; sometimes because the pulmonary vessels are contracted; sometimes because there is coalescence of the blood corpuscles from stasis and plugging of the minute ramifications of the pulmonary artery; sometimes because the blood coagulates, and this espe-

* The animal made a perfect recovery in this case. It lay without evidence of life for the full period of six minutes and a half, the longest period I have as yet known to be followed by recovery.

cially if the temperature of the air is high; sometimes because, again under high temperature, the muscles soon become rigid; and sometimes, it may be, because the nervous centres suffer molecular change so that they fail to recharge and resume function. These seem many difficulties, but really they are closely allied, and one day we shall see a mode of overcoming them altogether. Then the results will be much more striking than they even now are.

So much for artificial respiration; next as to electrical action. I have employed electricity, as before said, with three objects in view, and I have used it in various ways: as frictional electricity, as continuous current, as an intermittent current. On the whole, I find the best apparatus to be this convenient little persistent battery made by Schmidt and Robinson, of the Strand. If anything could be effected by the excitation of muscles from electrical action, we have in the instrument before us all we could reasonably desire.

Let us again proceed to fact. We have narcotised another rabbit rapidly until it is practically dead. We could restore the animal if we pursued the same method as in the last experiment: we will use the battery instead. We will use it first with the object of restarting muscular motion in the respiratory muscles. For this object some, in the human subject, put a needle from one pole into the tract of the phrenic nerve, and then apply the opposite pole to or over the diaphragm. Others put the needle under or subcutaneously upon the larynx—in plain, the position is of little moment if the second pole be in contact directly or indirectly with the diaphragm. I will bring one pole by a needle in contact with the larynx, and the other in contact with the diaphragm. And now when I make and break contact you see the respiratory act is perfect; the air enters the lungs readily, and I bring back inspiration and expiration as faithfully as if I were filling and emptying them with the bellows. I continue this action, but note what soon occurs: the muscles begin to respond more feebly, and quickly cease to respond; I gently increase the current and by this renewed action is seen again; at last the organs cease to act under any current; but if I change the current and pass it through the limbs of the animal the muscles of the limbs respond readily enough. Why not then the muscles of respiration? Because we have exhausted them by the electrical action: when I was sustaining respiration by the bellows my hand supplied for the time the respiratory power of the animal. I gave the force, and the muscles of the animal rested and restarted. When I used the electrical stimulus I took out of the muscles what remaining force was there—the primary force required for

recovery—and under a semblance of restoring life clenched death.

But let us go one step further; this animal could not be restored now by any known method: we will then open the thorax and look at the heart. At first sight the organ is seen at perfect rest, but in contact with the air it recommences to pulsate, and in a minute or so the auricle and ventricle on both sides are in rhythmical action. We will repeat the electrical current, letting it now pass through the heart at the lowest power. Observe what occurs: at once the organ flags and stops in ventricular systole. We have exhausted the heart as we previously exhausted the respiratory muscles.

I thought once it might be well to combine electrical excitation of the heart with artificial respiration by the hand-bellows. I had no success like that which follows simple artificial respiration, and after these experiences I feel it to unreasonable to recommend galvanic action as a means of resuscitation. Galvanism is a two-edged sword. It might, by accident I may say, in some cases, restart respiration, but it would in this respect be inferior in principle to artificial respiration, and in the majority of cases it would more effectively promote death than restore life, even when used with the specific object of exciting the respiratory muscles into natural play, or of exciting the heart. When used as it commonly is used merely to excite prolonged contraction of muscles, it is not aimless merely, but positively mischievous.

Still the phenomena excited by galvanic action, though as yet deceptive, are not to be ignored; one day we may see how to use the electrical excitation with advantage and on a known principle: but that day has not arrived.

Antidotal measures.—It has been hoped to neutralize the physiological action of chloroform by injection of antidotes into the veins. I tried the injection of ammonia into the veins as far back as the year 1854, and although the injection excited the heart it did not offer any material advantage. Liebreich has recently referred to strychnine as antidotal to chloroform. I had already tried that also without obtaining any indication of good result. On the whole the antidotal method is hardly applicable to chloroform. If a man or an animal is not practically dead from chloroform, if he still breathes, and circulates however feebly, he will recover best by being allowed to recover spontaneously; if he be practically dead the remedy is not an antidote, but a method by which the natural process of life may be correctly imitated in the motionless organism—a method carried on by force supplied from without until the inner force is revived.

The final question before us, the summary, is this: When

there is a death from chloroform what shall be done? I answer that at present we know of one process which may succeed, and that if it do not succeed we know of none other that can take its place. That process is prompt artificial respiration. But artificial respiration must be done properly to be effective; it must be done with the body at perfect rest; it must be done as we have done it here in our experiments by a double-acting bellows or pump which shall exhaust and fill the chest with air. It must be carried out steadily and gently; it must be withdrawn when there is any natural effort at respiration; it must be continued until a puncture of a vein shows that there is coagulation of the blood. Above all, it must be absolutely trusted until some new and definite advance is made the soundness of which is demonstrable by direct experiment. If to every hospital operating table and to every private operating chair a double-acting pump or a bellows were permanently attached and always ready for use, and if in emergency it were at once brought into action methodically and with fixed purpose, under the surety that if it failed all means will fail; if the body be kept meanwhile in entire repose, so that no violence nor shock be allowed to check the little remaining power of the heart, then I believe, from experimental data, that at least one in every three or four of the cases now ending fatally under chloroform would be saved.

And still there would remain work enough to be done: work to improve further the process of resuscitation as a general process; work to find an agent for anæsthesia which shall destroy sensibility, but shall not possibly endanger life.—*Medical Times and Gazette*, May 28 and July 23, 1870, pp. 574, 85.

109.—CHLOROFORM ADMINISTRATION.

By Dr. A. ERNEST SANSOM.

[The following short article is a critique upon some remarks in Dr. Richardson's paper on chloroform.]

All attempts to insure greater safety by the use of chloroform diluted with volatile media are at once condemned by Dr. Richardson as puerile and empirical. A table is given showing the great differences in specific gravity, vapour density, and boiling-point of the agents which are commingled, and from these figures it is supposed that the question is to be judged. I hold on the other hand that a dilution of chloroform with an equal bulk of absolute alcohol effectually insures the administration of an atmosphere containing as nearly as possible one-half the percentage which results when undiluted chloroform is employed. This is not at all a question of vapour densities

and boiling-points. It is not pretended that the evolved chloroform-vapour is diluted *pari passu* with the vaporised alcohol. As I have before stated the alcohol acts chiefly in restraining the volatility of the chloroform, and thus indirectly inducing a free dilution by favouring the admixture with air. This is no vague generalisation, but a deduction from experimental facts; and the success of the practice of thus inducing anæsthesia is attested by competent observers.

Dr. Richardson agrees with me in his estimate of the dangers of strong atmospheres of chloroform, especially at an early stage of the administration. His explanation of the exact source of the danger, however, requires reconsideration. Ad-ducing Prof. Rutherford's observations on the effects of other irritant vapours as analogical evidence, Dr. Richardson concludes that when chloroform induces cardiac syncope it acts by stimulation of the inferior branch of the vagus by the asphyxiated condition of the blood. This is no new theory; it was enunciated by Brown-Séquard: it is upheld by Dogiel (Reichert's und Dubois' Arch. 1866). But the researches of Scheinesson (Untersuchungen über den Einfluss des Chloroforms auf die Warmeverhältnisse des thierischen Organismus und den Blutkreislauf;" Arch. des Heilkunde 1869, Hft. 1, 2, 3) prove that this view is untenable. It is shown that chloroform has equally the power of slowing the heart's action in animals whose vagi have been previously divided. Even when the spinal cord was divided in the cervical region as well as the vagi and sympathetic, the heart's action was enfeebled by chloroform. The irresistible conclusion, therefore, is that chloroform has a special power upon the musculo-motor system of the heart.

The danger of chloroform resides in the fact that in strong doses it is a direct cardiac depressant. Its vapour when freely diluted, emotional causes of danger set aside, induces anæsthesia with very little risk. By previously diluting the chloroform with alcohol we can so restrain its volatility as to insure against the administered atmosphere being too strong at any given moment. The measure, is simple, safe, and practical.—*Med. Times and Gazette*, July 23, 1870, p. 107.

110.—ON THE THERAPEUTICAL USES OF CHLORAL.

By the EDITOR OF THE MEDICAL TIMES AND GAZETTE.

The physicians of the Royal Infirmary, Edinburgh, have had an ample field for observing the action of the drug in fever, and found it valuable in assisting and promoting recovery by palliating distressing symptoms, though it has no direct influ-

ence in cutting short the disease, or in any way affecting its natural course, "In doses of thirty grains, repeated every hour—two or three times if necessary—in most cases a quiet and refreshing sleep is produced, which serves greatly to maintain the strength of the patient." Appetite is sometimes apparently improved, and excitement and delirium are frequently diminished. Violent head symptoms may require increased doses, forty to sixty grains. And it appeared, "from a limited series of observations," that in fever chloral produces little or no effect on the temperature, as determined by the thermometer (Brit. Med. Journal, April 30, 1870).

We have already alluded to its value in *delirium tremens*, and considerable evidence of this might easily be adduced. Dr. J. H. Barnes records (Lancet, Nov. 27, 1869) ten cases of this disease treated by chloral, and in most of them quiet sleep was quickly induced. Dr. Cereville found in a case of the disorder 15 grains repeated for two successive days procure sleep and calmness (L'Union Médicale, Feb. 12, 1870). In the Edinburgh Royal Infirmary it is found to be "almost a curative agent in this disease, as in most cases, notwithstanding violent excitement or delirium, it produces a prolonged sleep, from which the patient frequently awakes sane and rational." And numerous communications to the medical journals at home and abroad might be quoted to the same effect.

In *acute mania* its effects are of the highest value. Dr. G. Crawford has related (Med. Times and Gazette, Jan. 22, 1870) a case of acute mania in a female, who had not slept during five consecutive minutes for five weeks, and who had taken opium and morphia without benefit. He prescribed twenty-five grains of chloral for three nights in succession, and its effects were marvellous. Tranquil continued sleep was procured, and the patient rapidly recovered. In two maniacal females, whom baths and opium had failed to tranquillise, Dr. De la Harpe found that thirty grains of chloral almost immediately caused sleep (L'Union Médicale, Feb. 1870); and Dr. J. B. Tuke, Dr. Clouston, Mr. R. Gardiner Hill, and others have found it, as Dr. J. B. Tuke terms it, "the most valuable means of producing sleep which has yet been introduced into the pharmacopœia of the Asylum Physicians."

Dr. Clouston (Brit. Med. Journal, May 7, 1870), a most accurate and trustworthy observer, after having given it in forty cases of various forms of insanity, has thus summed up his experience of it:—"It has proved a most safe and certain sleep-producer; by it we can compel sleep in any case. By means of this property attacks of insanity may probably be warded off in some cases. Its action in abating and soothing excitement is more uncertain than its sleep-producing power,

and lasts a shorter time than that of any signally powerful drug, but is most valuable in certain cases, especially in some recent and curable ones, where formerly we should have been afraid to give opium. Whether it does good or not, it never does harm; and is in this respect the very king of narcotics. It generally reduces the temperature slightly, but in maniacal excitement not nearly so much as does alcohol in large doses. It should be given to subdue brain excitement in doses beginning at twenty or thirty grains, repeated in from three to five hours. To produce sleep in great excitement, from forty to sixty grains are required, the latter dose not failing in one per cent. of the cases."

Dr. W. Macleod also has contributed (*Practitioner*, Aug. 1870) a valuable paper on the action of chloral in *Paralysis of the Insane*. He reports that when the patients are destructive and violent, the judicious administration of the drug acts as an excellent hypnotic by night, and soothing agent by day; that under its action patients have been free from destructive habits, and have gained in weight and strength; the action of the bowels and bladder have improved, and appetite has increased; that it lessens abnormal sensations, often cuts short hallucinations of hearing, and stops the propensity of patients to hurt or maim themselves. He had also found that in melancholia convalescence is advanced by its employment.

In *puerperal mania* the chloral has proved of great value. Thus, Dr. S. Teller relates a case in which morphia internally and by hypodermic injection was used without the least effect, and bromide of potassium caused excitement, but recovery took place under the use of the chloral. And Mr. A. M. Adams reports (*Lancet*, Jan. 22, 1870) a case in which he had given bromide of potassium, Battley's sedative, and chloroform by inhalation without relief, but the chloral, in doses varying from 40 to 60 grains, produced calm consciousness, followed by from six to eight hours of quiet sleep. In *puerperal convulsions* again it has given great relief, followed by recovery, after the failure of belladonna and the bromide of potassium (Mr. Hay in the *Practitioner*, March 1870), and Baron von Seydewitz has reported to the Obstetrical Society of London (*Med. Times and Gazette*, April 16, 1870) on the efficacy of "The Chloral Treatment of Eclampsia."

In *chorea* a large number of cases have been recorded showing the remedial influence of the drug. Sir J. Y. Simpson tells us (*Med. Times and Gazette*, Jan. 1, 1870) that he has given it in continuous small doses for one, two, or more weeks in succession in chorea "and apparently with most marked benefit." M. Bouchut has in severe cases found it beneficial, and M. Bricheteau has recorded (*Bullet. Gén. de Thérap.*, Nov. 1869)

his conviction of its value in severe chorea in children. Dr. Russell also relates (Med. Times and Gazette, Jan. 8, 1870) a case of very severe chorea in an apparently healthy woman during the early months of pregnancy, in which bromide of potassium was useless, but the administration of chloral was followed by the happiest results.

It has been given also in *tetanus* and recovery has followed. As it causes, when given in large doses, extreme muscular relaxation, it was natural to hope for benefit from its use in such a disease as tetanus, and M. Verneuil reported to the Société de Chirurgie (Med. Times and Gazette, April 30, 1870) a case of traumatic tetanus cured by chloral. The case was very marked and severe, the spasms affecting the muscles of the face, jaws, neck, spine, abdomen, and lower limbs, and resisting the influence of bromide of potassium and the hypodermic injection of morphia in large doses. But immediate relief was obtained by hydrate of chloral in full doses. In the course of the case, and a month elapsed before complete recovery, relapse occurred three times, and always when the chloral had been temporarily suspended. The daily dose varied from 3 jss. to 3 iij., and no ill results were at any time observed. We have seen a very similar case lately, under the care of Mr. Spencer Watson, in the Great Northern Hospital, ending, under treatment by chloral, in about the same time in perfect recovery. And M. Verneuil has also related to the Société de Chirurgie a case treated by M. Dufour, of Lausanne, by the chloral. The daily dose of the drug had to be carried to twelve grammes, but the patient left the Hospital cured at the end of a month (Gaz. Hebdom., July 8, 1870). It may be objected, and in M. Verneuil's cases has been said, that in these cases the patients recovered by lapse of time; but, at any rate, the chloral exerted an invaluable remedial influence by procuring relief from spasm, by giving sleep, and allowing the patients to take nourishment. And though our experience of the action of chloral in this disease is not yet sufficient to warrant full reliance on it, yet it is certainly enough to encourage further trials; and our hope in it is strengthened by Liebreich's discovery that the action of chloral and that of strychnia are so antagonistic that strychnia is an antidote in the case of chloral poisoning (Med. Times and Gazette, vol. ii., 1869, p. 723).

M. Marjolin stated to the Imperial Society of Surgery that he has administered the chloral internally to relieve the *severe pain from burns*, and with complete relief to the patient (L'Union Médicale, May 19, 1870).

It would be easy, did our space permit it, to add considerably to this list of the conditions in which the hydrate of chloral has proved remedial or highly useful. It has been employed with

the happiest effect for the relief of the cough in advanced phthisis of the lungs, and has proved a very valuable anodyne in some cases of gastralgia, pleurodynia, hysteralgia, dysmenorrhœa, &c., in the pain attendant on cancer, and acute local inflammations, and in lead colic and other forms of colic. In cases also of irritable bladder and chronic cystitis it has been found to give much longer and more perfect rest than large doses of opium.

In *phthisis pulmonalis*, the Physicians of the Edinburgh Infirmary have found chloral most valuable for producing sleep, for soothing irritation, and for relieving cough. Dr. J. Hughes Bennett observes (Practitioner, May, 1870) that such is the loss of appetite, increased weakness, and emaciation which follow the use of opiates and chlorodyne, that he never gives them except in the last stages of the disease, "and when, all hope of prolonging life having ceased, we choose the least of evils in procuring even unhealthy sleep. But matters are greatly changed when we are able to obtain the natural sleep that chloral gives. By its aid we can lull irritation, and give rest for a time, in many cases, without any injury whatever." He gives the results of its employment in twenty-one cases, and in the vast majority "the relief to the cough and restlessness at night, with the production of sound sleep, was most marked, while the head, tongue, and appetite were in no way affected."

We may note also that Mr. E. Lambert has lately (Edin. Med. and Surg. Journal, August, 1870) given us an instructive report of his experience of "the influence exerted by chloral on the pain of parturition." He gives fifteen grains every quarter of an hour "till some effect is produced, and according to the nature of that effect the further administration is to be regulated." He finds that it "does not only not suspend, but rather promotes, uterine contraction;" that it is of great value; and that, while "it is *the* hypnotic for the first stage of labour," it may be administered under favourable circumstances "during and at the close of the second stage, with the result of producing absolute unconsciousness in the same sense in which we understand unconsciousness under chloroform."

Lastly, we observe that Mr. Lawson Tait has found the chloral a valuable adjunct to opium and chloroform. A smaller dose of morphia is required if a little chloral be also given, and when a patient is under the influence of chloral the inhalation of a few drops of chloroform suffices to produce profound anæsthesia (Med. Times and Gazette, vol. i., 1870, p. 193).

The very important question as to the reduction of temperature by chloral must be considered as yet unsettled. Dr. Richardson found that, "during the narcotism produced by the substance there is invariably reduction of temperature,"

and "that in birds and rabbits the temperature may fall five, six, and seven degrees Fahr., and yet the animal may recover." And cases are not wanting to support the idea that it may be of great value—given in moderate and frequently repeated doses—for this purpose. But, on the other hand, some observers have failed to note any such effect, and others have noticed a diminution of only one or one and a half degrees Fahrenheit.

The drug should always be given in small doses at first—gr.xv. or gr.xx.—with the view of observing its effect in each individual case. The particular conditions which contraindicate its use have not yet been accurately defined, but weakness of the heart, and marked cerebral anæmia must be held, we think, to impose at least special caution in its employment. It may be given with perfect safety and perfect success to children, in doses of two grains to an infant of eighteen months, of three grains at three years of age, and of ten grains at nine or fourteen. As evidence of this, Mr. A. N. Adams has successfully given five grains three times a day, or six grains at bed-time, in a severe case of pertussis in a child of six years of age.

It is worthy of special note that when the chloral is given as a hypnotic, care should be taken, so far as is possible, to help and promote the desired effect by administering the drug at or near the accustomed hour of sleep, and by securing perfect quietude and rest to the patient. It has not unfrequently been observed to produce no effect, except perhaps some slight unsteadiness or giddiness if the patient has been moving about or there has been any noise or disturbance in his room, while the same dose will produce quiet and prolonged slumber when the individual has been in bed, and in circumstances favourable to hypnotism.

We do not pretend to have stated all the conditions in which the hydrate of chloral has been found useful; and no doubt it will prove of value against some disordered state in which, so far as we know, it has not yet been tried. Thus Liebreich has suggested that, as chloroform has been given with the idea of its dissolving biliary calculus, the choral is preferable for that purpose as furnishing chloroform in a nascent, and therefore more active, condition.

But it has been amply proved that, while the chloral will of course sometimes fail to produce the desired effect, it is in a very large number of cases unrivalled as a hypnotic and anodyne. It is, as a general rule, in appropriate dose, as sure a producer of sleep and soother of pain as opium itself or any of its preparations. It is more swift in action, more prolonged in effect, and produces a more calm and tranquil and innocent sleep. Sir

J. Y. Simpson observed, "Ever and anon cases are well-known to occur in practice in which patients declare their inability to take opium in any form without suffering severely from nausea, faintness, restlessness, and other evil effects. In several such cases I have used chloral as a hypnotic with perfect success." And again, it has been found "to produce its hypnotic effects where opium, from long-continued use, had ceased to do so." But its highest value, its greatest superiority, lies in the fact that the sleep it induces is nearer in character to natural sleep, to the sleep

"That knits up the ravelled sleeve of care;
The birth of each day's life, sore labour's bath."

than that excited by any other artificial means. Chloral sleep is much more natural than the sleep produced by opium, hitherto the most powerful and certain hypnotic. Dr. J. B. Russell (*Glasgow Med. Journal*) has well pointed out the differences:—"In both, as in natural sleep, the pupil is contracted to the utmost, but in chloral sleep it immediately dilates on awaking, just as in natural sleep. This is not the case in opium sleep. Again, chloral sleep is more natural in this respect—that the sleeper may be roused at any time, and at once recovers the full command of his functions; he may take food, pass urine, cough with full strength, expectorate, &c., and, as soon as the temporary excitation ceases, he may drop over again into unconsciousness. Not so with opium. The excretions are not disturbed by chloral. They are by opium."

The chloral sleep is, as already observed, gentle, calm, prolonged, refreshing, and followed by no unpleasant effects.—*Medical Times and Gazette*, Aug. 20, 1870, p. 207.

111.—NOTES ON THE HYDRATE OF CHLORAL.

By ALEX. MAXWELL ADAMS, Esq., Surgeon, 2nd Royal Lanark Militia.

[It is open to question whether the theory upon which the action of chloral is explained, beautiful though it is, is really true. It is not unlikely that it acts as a whole, and that its action is more likely to be weakened by the decomposition in question than otherwise. Whether true or not, however, it was the theory which led to the discovery of the fact.]

Although the mode of action of chloral may be involved in doubt, yet there can be none as to its value as a remedial agent, and I therefore beg, in the following rough notes, to briefly state the result of my experience, which has been somewhat varied, and has extended over a period of five months:—

As an Anodyne.—Chloral, as a general rule, will not alleviate

severe and persistent pain where it fails to induce sleep, its anodyne and hypnotic action being, in a great measure, dependent the one upon the other. Where the functions of the brain are intact, and the dose is a medicinal one, the hypnotic action of chloral is rarely so profound as to destroy all feeling or means of communication from without; therefore the paroxysm of aggravated neuralgia, for instance, will often suspend the action of the largest dose of chloral which it is safe to give. I have had two such cases lately under my care. I have found both patients (females) susceptible to the influence of 20 and 25 grain doses, *during the painless intervals*, but have entirely failed with 40-50, and on one occasion with 60 grains, to produce any effect whatever, *so long as the paroxysm lasted*. Immediately upon its cessation, however, such doses took instant effect, two, three, four, and five hours after administration. Chloral, when it is not likely to be retained by the stomach, may be given as an enema with success.

Case 1.—I was sent for the other night to visit an old patient labouring under excruciating pain in the stomach, attended with violent retching and vomiting. For some years past I have had this woman occasionally under my care, similarly affected, and have always found the attacks to be most obstinate and distressing. On this occasion I ordered one drachm of chloral to be dissolved in a wineglassful of fluid starch, and given as an enema. She slept within thirty minutes, and awoke six hours afterwards feeling well and free from pain. The pain did not return. Although chloral has failed in my hands to afford much relief in severe outward pain, more especially of a neuralgic character, yet I have found it highly beneficial in many cases of internal pain, viz., of the stomach, bowels, bladder, womb, &c. Case No. 1 is a fair sample, and I could give many. Chloral, however, upon the whole, is inferior to opium for anodyne purposes.

Chloral as a Hypnotic and Sedative in Functional and Organic Diseases of the Brain and Nervous System.—Opium is inadmissible in the treatment of many such cases, hazardous in some, and uncertain in all, often leading to results the very opposite of what was anticipated. The converse can be said of chloral—it is contra-indicated in no case where a sedative and hypnotic are required, and is safe and certain in all, leading to no other results saving those anxiously looked for. We have stood by the bedside of many a sad case, have given opium—only to aggravate, however—and have been obliged in reality to leave our case to sink or swim very much in the hands of nature, assisted by powerful nurses, strait-waistcoats, canvas sheeting, &c. All this is changed since the discovery of chloral. No matter how wild the delirium, how acute the mania, how

frightful the convulsions, we can now with almost positive certainty predict that there will in a very few minutes be calm repose. The following cases will serve to illustrate the above:—

Case 2.—Mrs. —, a fragile, delicate woman, was seized with *acute mania* four days after the birth of her first child. This was the most aggravated case of the kind it is possible to conceive, her struggles and cries defying all description. Gave two doses of bromide of potassium without benefit, then forty minims of Battley, which was repeated at the expiry of two hours, equally without result. I then put her under the influence of chloroform, thinking thereby to aid the opium in producing sleep, but still with no effect. I was now *hors de combat*, and could do little more than assist in the adjustment of sheets, for the purposes of restraint, as her head had been already shaved, ice applied, leeches, &c. This was on the 29th November, when chloral, as a therapeutic agent, was in its infancy. Having read an early notice by Liebreich regarding its efficacy, it now occurred to me to telegraph for a supply, which fortunately arrived in time to be of service, as my patient appeared to be *in extremis* when I administered the first dose—her extremities were cold, her pulse a mere vibration, and hardly perceptible at the wrist; but her cries and struggles continued unabated. I had, in fact, to extemporise a strait-waistcoat, as no manual force could keep her in bed. I administered 40 grains, and, as if by magic, in about five minutes she became quite calm and sensible, complained of great drowsiness, and within ten minutes fell into a profound sleep, which lasted for seven hours. Her pulse gradually gained in volume and diminished in frequency until it fell to 90 beats. She breathed rather quickly and heavily for the first two hours, but afterwards the sleep was natural and even light. Great drowsiness all next day; pulse improving; takes food, and is tolerably sensible. Towards night the mania returned with great fury; gave 40 grains of chloral as before, with exactly the same result—namely, an almost immediate return of calm consciousness, followed by a prolonged but natural sleep. I was obliged to continue the use of chloral at intervals, for about two months, in this case, and always with the same marked benefit. There was considerable retention of urine throughout, but she always voided it freely when under the influence of chloral. I soon came to know to a positive certainty that this would be so, and was often saved the necessity of using the catheter—a most difficult and dangerous operation in such a case. The bowels, also, although very torpid at other times, frequently acted without medicine when she was under the influence of chloral. This patient is now quite well.

Case 3.—Mr. —, a farmer aged 73, a man who had hitherto enjoyed perfect health, was found lying insensible on the floor on the 14th February, an hour after he had dined. This state of profound stupor lasted for about forty minutes, when he fell into violent convulsions, which continued, with slight remissions, for nearly five hours. My friend, Mr. Logan, was associated with me in this case. The temples were leeches, ice applied to the head, the bowels acted upon by enemata, and we then left him lying perfectly quiet, but in a state of profound coma. The pupils were contracted and fixed, face flushed, and the pulse slow and laboured. I found him next morning acutely maniacal, being kept in bed with the utmost difficulty by three powerful men. He had been in this state for eight hours. I gave him 40 grains of chloral, and in a few minutes his struggles and cries ceased, and we laid him down in bed. I found his bladder to be very much distended, and used the catheter; but before the instrument was withdrawn he fell into a profound sleep, which lasted, with interruptions, for forty-two hours. The interruptions in question were, that during the course of this prolonged sleep he awakened up about every five hours, asked for a vessel in which to make water, voided it freely, took a drink, and dropped over again into a deep slumber. When I entered the house a few hours after this long sleep, I found him, to my intense astonishment, up, dressed, and reading the newspapers. He attended church and market for about a month after this attack, but is now paralysed and breaking up.

Case 4.—I was called hurriedly, about a month ago, to visit Mrs. —, a highly nervous woman, who had been much annoyed for some time, and had passed many sleepless nights. I found her with a flushed face, and quick bounding pulse. At times she talked incoherently and struggled violently, at others became quite rigid, resting upon the back of her head and heels. I gave her 30 grains of chloral; symptoms improved, but no sleep; gave her 30 grains more in an hour, when she slept in about four minutes, and awakened up eight hours afterwards quite calm and collected; no return of delirium.

Case 5.—*Delirium tremens*, complicated with *rheumatic fever*. Has not slept for eight days. Considerable delirium. April 11th, 8 p.m. Gave 30 grains of chloral. No effect. 9 p.m. Repeated the above dose. 9.40. Sound asleep, and slept continuously for five hours. Wakened up for a few minutes, and then slept calmly and soundly for three hours. April 12th. Very drowsy all day, and has had broken snatches of sleep. Delirium quite gone. Got somewhat restless towards night. Ordered 35 grains of chloral. A few minutes after administration showed symptoms of *gentle intoxication*,—singing, &c.

Was sound asleep in half-an-hour, and slept uninterruptedly for three hours. Had a good deal of broken sleep for many hours after. Patient now quite rational. No return of the delirium. This, and one other, are the only cases in which I have seen anything like excitement to precede sleep. The chloral was longer in acting in this case than in any of my other cases, but the result has been equally satisfactory.

Case 6.—*Tubercular meningitis* of three weeks' standing in a child aged four. Has been convulsed for the last three days. April 11th. Ordered five grains of chloral to be given with a little syrup and water every three hours, until a sedative effect was produced. Had three doses. Convulsions ceased after the second, and I found the little sufferer now lying in a peaceful sleep. April 12th. A threatening of convulsions towards night. Five grains to be given, and repeated in three hours. Slept calmly all night, and was perfectly quiet all next day. Eyesight gone for days, and pupils quite insensible. April 13th. Return of the convulsions. Ordered chloral as before. Same effect. Prolonged sleep, and a state of perfect calm enduring all next day.

I shall now consider the other cases in which I have used chloral with benefit. In severe *paroxysms of asthma* I have found it to relieve the spasm and to induce sleep. In *congestive bronchitis* it has proved equally beneficial in my hands. In such cases, from 20 to 30 grains may be given as a hypnotic and sedative. In irritating and exhaustive *coughs*, chloral may be given simply as a sedative in from 10 to 15 grain doses two or three times daily, either alone or combined with expectorants, as the case may demand. Chloral is quite a safe remedy in pulmonary affections, as it does not inspissate the mucus, tend to congest the lungs, stifle cough, or interfere with the play or action of the organ in any way. In several cases of asthma and congestive bronchitis I have induced profound sleep by a 30 grain dose, and in each individual case the patient has been able to sit up in bed and cough and expectorate, just as if he had been in a natural sleep. I have used chloral very largely in *whooping cough*, and can give it the highest commendation. In urgent cases it will often check the development of serious head and chest complications, by mitigating the cough and soothing nervous irritability.

Dose of Chloral, and Mode of Administration.—In all my urgent cases, I have given as much as 40 grains for a first dose, without observing any alarming or injurious effects, and, in the after treatment of such cases, have given as much as 60 grains, with a like negative effect as regards danger or injury to the system. Dr. Russell, in his very valuable paper, in the February number of this *Journal*, has clearly demonstrated that

40 grains is an overdose in the treatment of the delirium of typhus; but I think that other cases will frequently present themselves to the general practitioner where 40 grains will prove the most efficacious first dose. The strength and constitution of the patient, conjoined with the severity of the symptoms, must, however, regulate the dose in a great measure. As a rule, 30 grains are usually sufficient to produce all the sedative and hypnotic effects peculiar to chloral, and if such a dose should fail, a second and similar quantity may be given within the hour. This is a safe mode of administration, by which you are enabled to discover, without risk, what quantity of chloral your patient actually requires, should it be necessary to recur to it again. Never give more than 40 grains for a first dose; never, I would say, give more than 60 at once under any circumstances, and be perfectly certain in your own mind, by previous administration and careful observation, that such a dose can be tolerated, in any case, before it is ventured upon. I generally give such doses in six drachms of syrup and six of water. The above remarks are applicable to serious and urgent cases, such as acute mania, *delirium tremens*, convulsions, phrenitis, and all similar aggravated forms of head and nervous affections. In milder cases, from 20 to 25 grains will generally soothe and induce sleep. For children the dose depends entirely upon the age. One grain for every year I consider to be a safe rule.

Dangers of Chloral.—In an overdose chloral is likely to overpower the brain and action of the heart. It is quite a safe remedy, however, if given with ordinary caution and judgment.

Therapeutic and Physiological Action of Chloral.—In most cases chloral induces sleep in from ten to twenty minutes, the patient dropping calmly and naturally into a deep slumber. The sleep thereby induced, save in exceptional cases, usually lasts from four to eight hours. I speak of continuous sleep. The sedative action of the drug, leading to drowsiness and snatches of sleep, is usually maintained for twelve or fifteen hours. You can raise your patient out of a chloral sleep to full consciousness almost at any time. Pain, or a strong desire to void urine, will often do this without your interference. Chloral does not constipate the bowels, paralyse the bladder, dry up the bronchial tubes, or otherwise interfere with the action of the respiratory organs, like opium; neither does it lead to any of its disagreeable after-effects, such as nausea, giddiness, head-ache, depression of spirits, &c. Chloral not only does not lead to torpidity of the bladder and bowels, but would appear, owing to some peculiar reflex action, to stimulate them to a more healthy condition where such a state of matters already exists. See Cases 2 and 3.

Chloral does not lead to congestion of the brain, and is therefore peculiarly applicable to the treatment of head affections. The pupils are always contracted, when there is no dilatation from other causes, under the chloral sleep. They immediately dilate, however, when the patient awakes or is roused. Chloral lowers the action of the heart and reduces the temperature of the body when such action and temperature are above the standard of health,—but in cases of feeble circulation I have found it to act as a gentle stimulant, restoring and equalising the circulation throughout the outer surfaces of the body and extremities. The breathing is quickened for the first two hours, or thereabouts, after the successful administration of chloral, but it soon falls to what we are accustomed to see in natural sleep. The sleep of chloral is more allied to nature than that induced by any other drug, and comes on with much greater speed and certainty. Patients who have habituated themselves to the use of opium, and who are consequently unsusceptible to its hypnotic and sedative influence, are quite amenable to the action of chloral.—*Glasgow Medical Journal*, May, 1870, p. 364.

112.—ON THE DOSE OF THE HYDRATE OF CHLORAL.

By WEEDEN COOKE, Esq.

[The claims of chloral upon our notice and critical examination are no ordinary ones. This must be our apology for introducing so much upon this one subject in this and our last volume.]

Since the publication of my short report on this subject, I have had occasion to prescribe the chloral for a young lady aged 22, having a painful mammary tumour which much disturbs her rest at night. Fifteen grains make her quickly drowsy, and she sleeps well till morning. A case of uterine cancer, relieved by ten grains three times a day, began to complain of pain again, and fifteen grains were prescribed. The effect was remarkable. She was, as reported by both house-surgeon and nurse, intoxicated by each dose, and of course it was reduced. In a case of cancer of the tongue made comfortable by ten grains three times a day, the patient caught severe cold and became restless at night. Twenty grains were ordered at bed-time. He complained of headache, and too great drowsiness, and upon the reduction of the dose to fifteen grains, he was relieved of any unpleasant symptoms, and sleeps all night. In one case only, an old woman with advanced cancer of the breast and solid oedema of the arm, have I had occasion to exceed the twenty grains as a night draught. At first she was made perfectly comfortable with twenty grains,

but now she is taking thirty-five grains most beneficially. I have no bias or reticence in the matter. I only want to secure that we shall not lose the great advantage which this drug seems to offer us by any possible mischances in its administration. If I might be allowed to make a suggestion for safety's sake, I would counsel that ten grains should be the primary dose, and then let it be increased if necessary, *secundum artem*. There is still the delicate question of the standard quality of the drug, which may have something to do with diversities of effects.—*Lancet*, June 4, 1870, p. 821.

113.—ON THE HYDRATE OF CHLORAL.

By Dr. THOMAS JAMES WOODHOUSE, Fulham.

At the Royal Hospital for Incurables, Putney, there is a patient suffering from cancer. She was admitted at the end of last year, and for a long time I tried a number of drugs to ease her intense suffering—opium, morphia, and cannabis, but they all had but very transient effects, and were followed by derangement of stomach.

Seeing by a recent number of the *Lancet* that Mr. Weeden Cooke recommends hydrate of chloral in ten-grain doses three times a day in such cases, I determined to make a trial of this drug. She accordingly took ten grains three times daily, beginning May 12th. The next day she was certainly better; she had had a good night, but the pain was not altogether gone; there was no sickness nor headache. She was directed to take a dose when in pain. To my great satisfaction she had to take only one or two doses; for from that time to this, she has had no return of pain.—*Lancet*, June 4, 1870, p. 821.

114.—ON THE HYDRATE OF BROMAL.

By Dr. E. STEINAUR, Berlin.

There is a valuable article by Dr. Steinaur, in the last volume of "Virchow's Archiv," on the action of the hydrate of bromal on animals and on man. The experiments were made in the Berlin Pathological Institute, and were under the immediate observation of Liebreich himself. The hydrate of bromal, according to the observations detailed, when administered to animals, undergoes a similar change to that undergone by chloral, being converted by the alkalies of the blood into bromoform. But this change goes on slowly, for at the end of an hour and a-half there was found in the blood in addition to bromoform still some undecomposed bromal. The substance is

further oxidised and evacuated in the urine as bromide. The symptoms produced by bromal on animals (frogs, rabbits, guinea-pigs) were first a stage of restlessness, followed by imperfect sleep and anæsthesia, and finally dyspnœa and death with or without convulsions. After large doses, both in frogs and rabbits, the heart was found after death relaxed and distended,—whereas, after smaller doses, it was contracted. In the former case there is probably direct paralysis of the heart by the bromoform, such as occurs after large doses of chloroform. The preliminary stage of restlessness which has no equivalent after administration of chloral, is ascribed to the action of the bromal aldehyde itself, the decomposition occurring, as stated above, more slowly than is the case with chloral. The author observed a stage of restlessness, after a hypnotic dose of chloral, in a patient suffering under gout, and he ascribed this to the acid state of the blood preventing the usual decomposition into chloroform. With this view he administered alkalis to the patient, and after a few days the same dose of chloral produced the usual hypnotic effect. Proceeding from this, he applied the same principle in his experiments with bromal. Having injected carbonate of soda subcutaneously in rabbits, he then injected the hydrate of bromal, and found that the stage of restlessness was entirely absent. The author has administered bromal to man in only a few cases. He has found good effects from it in epilepsy, and in soothing the pains of tabes dorsalis. The method of administration which he has ultimately employed is, first, in the morning and at mid-day a powder containing about 14 grains sodæ bicarb.; then in the evening two to four pills, containing each from $\frac{1}{2}$ grain to $1\frac{1}{2}$ grain of bromal.—*Medical Press and Circular*, Aug. 24, 1870, p. 154.

115.—ON NITRITE OF AMYL, AND SOME OTHER NEW REMEDIES.

By Dr. BENJAMIN W. RICHARDSON, F.R.S.

Nitrite of Amyl.—The physiological action of nitrite of amyl is, as we have learned, directly exerted on the ganglionic nervous tract; it paralyses so that the nervous supply over the extreme vascular system is impaired; and the muscular system generally, if the effect be sustained, is thrown into relaxation. The observation of this effect of the nitrite led me to suggest it primarily as a remedy for excessive spasmodic action—for tetanus specially—and it has been applied in the direction thus pointed out with much success. Lately, Mr. Foster, of Huntingdon, has administered the nitrite with complete success in a case of traumatic tetanus—holding the convulsions in check for

the long period of nine days. The nitrite is best administered by inhalation, five minims on a piece of folded linen or handkerchief being the dose for an adult. The remedy will act if it be given by the mouth; but as the action is very energetic, and requires to be kept under the control of the administrator, it is much safer to administer by inhalation. In tetanus, the periods of recurrence of the spasmodic attacks should be carefully watched, and when the paroxysm is threatened, the inhalation of the nitrite should commence so as to subdue the spasmodic seizure. In spasmodic angina, in asthma, and in colic, the agent has been administered also with success.

It must be clearly understood that the action of the nitrite is curative only in so far as it controls the spasm in the cases named—that is to say, it prevents death, and so leaves time for recovery. I observed originally, and on the observation the suggestion of the practice is founded, that frogs under strychnine tetanus are immediately relieved of spasm by the nitrite of amyl, and that with great care in keeping the animals free of spasm, they can be sustained until the strychnine is removed from the body, when there is recovery; and in this explanation I define the true place of the nitrite as a remedy. In tetanus the administration of the nitrite is not to be considered as displacing other rational means of cure. On the contrary, it favours other means: it enables food to be freely supplied, it gives time for the action of purgatives and diuretics, or for the employment of the hot-air bath.

Caustic Ethylates.—The construction of the ethylates of potassium and sodium was described at the early part of this lecture. The ethylates are crystalline substances, in which one atom of hydrogen of absolute alcohol is substituted by one of potassium or of sodium. Brought into contact with the body, the ethylates at first produce no action, but as they pick up water from the tissues they are decomposed, the potassium or sodium is oxidised, yielding caustic potassa or soda in the fresh state, and alcohol is reformed from the recombination of hydrogen derived from the water. I propose the employment of these ethylates as caustics. I believe they will be found to be the most effective and manageable of all caustics; and that in cases of cancer, when it is desirable to destroy structure without resorting to the knife, and in cases of nævus and other simple growths, they will be of essential service. The ethylates can be held in solution with alcohol in various degrees of strength; the solution can be applied with a glass brush or injected by the needle, and a slow or quick effect can be insured, according to the wish of the operator. The ethylate of potassium is the most active agent.

Triethylic Ether.—When the ethylate of sodium is acted upon

by chloroform, there is produced an ether, called triethylic, of which there is here a specimen. The chemical action which takes place is very fierce, and great care is required to secure a fair product. In the decomposition the chlorine of the chloroform combines with the sodium of the ethylate to form chloride of sodium, which salt falls down, and triethylic ether remains. As chloroform contains three atoms of chlorine, each single part of chloroform decomposes three parts of ethylate of sodium. Thus:— $3(\text{C}_2\text{H}_5\text{NaO})$, ethylate of sodium; CHCl_3 , chloroform = 3NaCl , chloride of sodium, and $\text{C}_7\text{H}_{16}\text{O}_3$, tryethylic ether.

The ether is a heavy, aromatic, ethereal fluid, having a vapour density of 74, a specific gravity of .896, and a boiling point of 145°C. , 297°F. It acts much like alcohol physiologically, and I have lately used it as a menstruum of ethylic ether for general anæsthesia. The ethylic ether carries over with it, in evaporation, sufficient of the heavier ether to form a compound vapour which is very pleasant to breathe and equable in action. I have administered this compound twice for operations on the eye—once while Mr. Brudenell Carter operated for strabismus, and once while Mr. Walker, of Liverpool, operated for cataract. The anæsthesia in both cases was perfect. The ether also forms an excellent mixture with bichloride of methylene; and were mixtures of anæsthetic substances satisfactory scientific applications, we might bring it into extensive use. I accept it, however, rather as an index of the way I should go than of a resting-place. I look for a simple ether which shall have the full and safe qualities of the mixture, together with perfect stability. We have before us, in truth, already another ether, called trimethylic, made by acting on methylate of sodium, CH_3NaO , with chloroform; the product being $3(\text{NaCl})$, common salt, and $\text{C}_4\text{H}_{10}\text{O}_3$, trimethylic ether. But this ether which has a vapour density of 53, and a high boiling point, is not quite, though it approaches, the substance we require.—*Medical Times and Gazette*, Oct. 22, 1870, p. 472.

116.—ON THE ACTION OF MERCURY.

By Dr. JAMES ROSS.

There can be no doubt that, during the administration of mercury, the blood undergoes many changes; but the question to be determined is, whether this is a primary or a secondary action. The repair of a slight external injury produces alterations in the blood; but in this case the change in the blood is secondary to the change in the tissues: and it is quite possible that the same may be the case with the blood changes produced

by mercury. According to the theory of inflammation and of syphilis which I adopt, the principal part of the morbid process takes place in the tissues internal to the blood-vessels, and it is only consistent that I should endeavour to elaborate a theory of the action of mercury in the same direction. On the other hand, those who are satisfied with the zymotic theory of syphilis will be naturally inclined to believe that mercury produces its primary action upon the blood. Nor can I prove a negative against this theory, and therefore cannot positively say that it is erroneous. I will, however, claim this much for the theory I am about to advance, that it will explain more of the known effects of mercury, and that the practical maxims by which we are guided in its administration at the bed-side can be readily deduced from it.

I have already said that I would take it for granted that the salt of mercury is absorbed into the blood, and I conceive that after absorption it has an affinity for a certain tract of tissue. The tissues for which mercury has an affinity are generally the same as those attacked by syphilis, namely, the white tissues of the body. It seems to affect by preference the joint ends of the long bones, serous membranes, certain parts of the true skin, and probably the submucous tissue of the tonsils, fauces, and gums; and it appears to seek an outlet from the body mainly through the salivary glands and the mucous membrane of the alimentary canal, especially that of the rectum. The nature of the influence exerted by mercury over the tissues for which it has an affinity is that of a stimulant; but in order to prevent misconceptions I must dwell a little on the meaning which I attach to that term. Pereira defines a stimulant "as an agent which increases the vital activity of an organ." When, however, I say that mercury is a stimulant to the tissues for which it has an affinity, I do not mean to assert that the real effect which ensues is one of vital activity. The reverse of this is very often the case; but even when death of the tissue results the tendency of the drug may be that of a stimulant. For the sake of illustration, let me imagine a person looking at a boy's kite falling to the ground, and suppose him ignorant of the special characteristics of this instrument, but knowing the general properties of matter. He will know that the kite is falling by the force of gravity, and may think that by pulling at the string attached he will accelerate its fall. If he makes a very slight pull, he will succeed; a little stronger pull, and he may still succeed: and this he may regard as a complete verification of his argumentation. But when the pull is still stronger, the kite makes a turn and begins to ascend. By gradually increasing the tension of the string he may get the kite to ascend more steadily and more rapidly, and he may now

be ready to come to the conclusion that the more he pulls the more quickly will the kite ascend, when all at once the balance is overthrown and the kite descends again. Here then are the most opposite effects produced by only slight differences in degree of the same cause, namely, slight variations in the tension of the string attached to the kite. The explanation of this is that when we call the tension of the string the cause of the motion of the kite we employ the term in its popular and not in its scientific sense. In the scientific sense the cause is the aggregate of conditions or circumstances requisite to the effect. The scientific cause of the motion of the kite is not only the tension of the string, but the properties of the kite itself, with those of the earth and of the atmosphere which surrounds the kite. In investigating, therefore, the cause of the effects attributed to mercury we ought to remember that the scientific cause is not the mercury only, but also the laws of the body with that of its environment. Hence it is that the most opposite effects may be explained by one and the same tendency of action of one of the factors of the cause. It now remains for me to show that the main effects of mercury on the body may be explained on the supposition that it tends to stimulate to increased activity the tissues which I have already specified. I shall now endeavour to apply this theory very briefly to the explanation of the phenomena. When mercury is administered in health it may, by stimulating in excess, produce local inflammations in the tissues for which it has an affinity. I cannot say why mercury acts upon the salivary glands, gums, fauces, and upon some parts of the alimentary canal; our best plan is to accept the facts and endeavour to utilise them in practice. These facts may at some future time be explained when the laws of the correlation of growth, or what Paget calls "complementary nutrition," are better ascertained. According, then, to my theory, the changes in the blood and the nervous symptoms result from anterior nutritive changes in the white tissues.

When mercury is administered in disease, say in the first stage of inflammation of a tissue for which it has an affinity, it may act in two ways; it may aggravate the disease, or it may develop the second stage; hence the caution which is generally laid down in books, that mercury should only be employed after depletion. Mercury, in short, is a hazardous remedy for the first stage of the disease, and should in general not be employed till the skin is moist and the pulse has lost its hardness. In the second step of inflammation of a tissue, for which mercury has an affinity, it stimulates it to increased action; more blood is attracted to the part; the circulation through it is rendered more active; absorption of effused fluids takes place, and the

cells of the part rise in the order of organization: hence the entire course of events in this stage is towards health. Mercury is not a remedy for the generality of mucous membranes, just because it has no special affinity for them.

In syphilis, mercury is administered when the base of the primary ulcer is thickened. It acts by stimulating the tissues surrounding the ulcer to increased action. Great care, however, should be taken not to push the action of the drug too far during the period of the disease. It ought to be remembered that the syphilitic gemmules may already be circulating in the blood, and if these gemmules and the mercury impress their motion upon any tissue at the same time, the disease may be very much aggravated. I have already said that some of the tissues of the body may be undergoing the syphilitic movement without any external lesion being produced. But if the mercury begins to affect this tissue at that time, a severe lesion may be the result. This will explain why some medical men have attributed the syphilitic lesions to the mercury itself, since the drug has in this case acted as a concurring cause. The mercury should be administered, not before a lesion takes place, but during chronic thickenings and other lesions, in order to stimulate the tissues to increased activity, and only when the lesion takes place in a tissue for which the mercury has an affinity. The action of mercury therefore in syphilis is not at all comparable to the action of an alkali in neutralizing an acid, or to that of an antidote to a poison, but is more analogous to the action of a spur in riding a horse. Sometimes the spur may be useful, sometimes injurious; but the object is to get the horse to accomplish a journey. Similarly, mercury may be useful at times, may do a great deal of harm at other times; but, in determining under what circumstances it should be employed, it ought to be remembered that the aim of treatment is not to check or repress the disease, but to assist it through a revolution. To borrow an illustration from the life of states; the function of the medical man in the treatment of syphilis is not like that of the stern warrior, who suppresses a revolution by opposing force to force and compels order, but to that of the great and wise statesman, who directs the social forces into a particular channel, and out of the discordant elements evokes the double events of order and progress.

Dr. Ringer, in his recent work on therapeutics, recommends mercury in mumps, tonsillitis, and dysentery; and this is only what might be anticipated if my theory is the correct one. In the present divided state of opinion, I shall not undertake to decide whether or not it has a special action over the liver, but I will say that Dr. Bennett's experiments are not at all conclusive in the negative.—*Practitioner*, Oct. 1870, p. 218.

117.—THE MECHANICAL DIVISION OF MERCURY.

Mr. J. CALVIN, of Texas, communicates the following process to the *Chicago Pharmacist*:—It is headed “Quick way of extinguishing mercury.” He states that on shaking tincture of tolu with mercury (one fluid drachm of the tincture with three ounces of mercury) in a strong two-ounce vial, the whole of the mercury was reduced to a state of minute division, which is easily mixed with fatty or other ingredients.—*Med. Press and Circular*, May 25, 1870, p. 417.

118.—THE ANÆSTHETIC PROPERTIES OF CARBOLIC ACID
IN SOME SKIN DISEASES.

By ERASMUS WILSON, Esq., F.R.S., Professor of Dermatology
in the Royal College of Surgeons, England.

[Mr. Wilson was consulted in 1868 by an officer, on account of great hypertrophy of the epithelium of the glans penis. The end of the penis was flat, and had the appearance of being spread out, and the whole of the flattened surface was covered with a horny, almost warty, layer of epithelium.]

The history of the case was as follows:—The patient had been the subject of herpes præputialis, repeated, as is usual with that complaint, periodically; he was also, when these attacks took place, tormented with phymosis; and his surgeon, to remove the phymosis, performed the operation of circumcision. This happened in 1861, seven years previously to his coming under my care; and from the period of the operation up to the present time, irritation of the part had continued to prevail; the papillæ of the glans and inner surface of the stump of the prepuce had increased in size, and a thickening and condensation of the epithelium was the result. He had made many efforts to obtain a cure, and was almost in despair.

I proposed to him to remove the horny layer and obliterate the hypertrophous papillæ by means of a solution of equal parts of potassa fusa and water, and this I have succeeded in accomplishing almost completely. The application of the caustic was excessively painful, so that only a small portion of the growth could be operated on at a time; and at the end of a few days there was so much inflammation that it became imperative to desist for a week or more before resuming the use of the remedy. This circumstance, and the necessary pursuit of his military duties, have protracted the cure for nearly two years; but during that period he has been making sure, although slow progress, and bit by bit the extent of the disease has been diminished.

In the course of the treatment I endeavoured to persuade

him to apply the caustic himself, and supplied him with the material; but the attempt failed in consequence of the excruciating pain caused by its application. It was evident that some share of this extreme sensitiveness was due to the sensibility of the organ, and not a little to irritability induced by prolonged inflammation. This was our position one day recently: I had denuded the base of a large portion of the hypertrophous growth; but another application was necessary to reach the papillæ; and the patient's power of supporting further pain was exhausted. There were reasons why chloroform could not be employed; local anæsthesia had, possibly from mismanagement, complicated the difficulty, and I was beginning to feel a little puzzled for the means of attaining my object, when it occurred to me to attempt to conquer the morbid irritability of the part by means of carbolic acid. It may be premised that in consequence of this dread of pain, I had left the application of the caustic to the patient himself, merely encouraging him to proceed, and pointing out the spots which he should principally attack; and when I suggested, after some minutes of agony, that he should touch the raw surface with carbolic acid, he shrunk from the proposal, having on several occasions used it before, and found it very painful. Nevertheless, the occasion was pressing, and he brushed the surface with carbolic acid, and was gratified by finding that he could do so without suffering. The carbolic acid exercised its usual effect of coagulating the albumen of the surface, and producing a white film; and after repeated applications the film had reached a considerable thickness. Now was the time for the renewal of the original caustic, and after some hesitation it was applied; but to the patient's astonishment and my own satisfaction with an almost painless result. The caustic which a few minutes before was utterly unendurable, could be used now, and with perfect freedom—almost with inconvenience. We followed up our discovery, and left very little of the surface for future operation.

This anæsthetic property of carbolic acid was not altogether new to me; but I had never before seen its power so strikingly manifested. I have used it often since, and always with the most satisfactory result; and I employ it at present, very commonly, previously to the application of caustic to lupus and epithelioma. It benumbs the surface, it dulls the excessive sensibility of the superficial nerves, and it thereby permits the caustic action of our remedies, with a great reduction in the amount of pain. It admits, I have no doubt, of more extensive application, and will, I have reason to believe, come into general use for a similar purpose.—*Journal of Cutaneous Medicine, June, 1870, p. 5.*

119.—EXPERIMENTAL INVESTIGATIONS INTO THE ACTION AND USES OF GELSEMIUM SEMPERVIRENS.

By Dr. ROBERTS BARTHOLOW, A.M., Professor of Materia Medica and Therapeutics in the Medical College of Ohio, Cincinnati, U.S.

Gelsemium is included in the "Secondary List" of the U.S. Pharmacopœia. It was originally introduced into medical practice by the physicians of southern United States, but unfortunately, its mode of action and the character of cases to which it was applicable not being well understood, it did not come into general use. The so-called "Eclectics" adopted it into their Materia Medica, and much of the information in regard to its therapeutical effects now current was derived from them. Recently, however, the attention of the regular profession has become more fully awakened to the value of gelsemium as a remedial agent, and various articles setting forth its virtues have lately been published. Hitherto its physiological action has not been submitted to systematic examination. Very recently its chemical constitution has been accurately determined by Professor Wormley, of Columbus, Ohio. To ascertain whether the alkaloid he had isolated possessed the toxic activity of the plant, Dr. Wormley injected a solution of the chloride of gelsemia under the skin of a cat, and in this way observed some of the physiological effects; but he extended his researches no further in this direction.

Summary of Physiological Action.—1. Being a crystalloidal substance, gelsemiate of gelsemia, the active principle, is rapidly absorbed into the blood.

2. It has a selective action on the nervous system.

3. It acts chiefly on the motor portion of the cord.

4. Its paralysing effect is due to its action on the motor centre, and not to an action on the peripheral nerve-fibres.

5. It acts also on the sensory portion of the cord, producing at last complete anæsthesia; but this effect in warm-blooded animals and man is toxic only, and follows the paralysis of the motor functions.

Synergists.—All the paralyzers are synergistic to gelsemium. In its physiological action, gelsemium corresponds more nearly to conium than to any other agent. Conium is a paralyser, but unlike gelsemium, the paralysis commences at the periphery, and rapidly extends to the motor centre. Conium, like gelsemium, does not destroy the muscular irritability. Gelsemium impairs the sensibility of the sensory nerves, which conium does not. Both cause death by asphyxia—paralysis of the muscles of respiration. In their effects on the brain these agents act similarly. Neither destroys, *per se*, the functions of the brain,

consciousness being preserved until carbonic acid narcosis supervenes. Both produce dilatation of the pupil and blindness; but gelsemium more distinctly paralyses the third pair than conium.

Antagonists.—The subject of physiological antagonisms is one of great interest and importance. I have, accordingly, devoted much time and labour to a determination of the supposed antagonists to gelsemium. It will suffice to present here the conclusions to which I have arrived.

A priori, nothing would seem more complete than the opposition in physiological effects of gelsemium and *strychnia*, throughout the whole range of their action, except in the rate at which they move to affect the system. Repeated trials on warm-blooded animals—cats and pigeons—have convinced me that there is no antagonism. An animal under the influence of gelsemium is quickly tetanised by strychnia. The same observation has been made by Guttman, in regard to conia and strychnia. A toxic dose of strychnia proves fatal before the animal can be affected by gelsemium, if the two agents be administered simultaneously; hence it is necessary, in order to ascertain the existence of a supposed antagonism, to produce the full effects of gelsemium before administering strychnia.

As respects their physiological antagonism, there are many points of resemblance, and some points of difference, between *atropia* and gelsemium.

The dilatation of the pupil produced by both is due, in the case of atropia, to contraction of the radiating fibres of the iris; in the case of gelsemium, to a paretic state of the circular fibres.

In their action on the heart these two agents are antagonistic—atropia increasing the cardiac movements, and gelsemium diminishing them.

As both cause paralysis of the muscles of respiration, it is obvious that one cannot be used against the toxic symptoms produced by the other. By experiment we ascertain that this observation is correct. Atropia hastens the paralysing action of gelsemium on the respiratory muscles, but maintains the action of the heart for some minutes after the total cessation of the respiratory movements—much longer, indeed, than the heart continues to beat after stoppage of respiration, when gelsemium alone is used.

The opposite effects of gelsemium and *physostigma* on the pupil suggest an antagonism at other points in the range of their action. It is found on trial, however, that physostigma does not overcome the dilatation of the pupil caused by gelsemium, a result apparently due to the powerful action of the latter as a paralyser of the third pair. As respects toxic effects,

physostigma is synergistic to gelsemium. In my experiments on warm-blooded animals, I ascertained that death resulted more speedily from a fatal dose of gelsemium when physostigma was also administered.—*Practitioner*, Oct. 1870, p. 200.

120.—THERAPEUTICAL PROPERTIES OF IODINE.

By Dr. W. WHITELAW, Kirkintilloch, N.B.

In connexion with Dr. Stirton's practical paper on iodine, published in your impression for September 3, I beg to refer your readers to a compendium of Dr. Richardson's well-known article on iodine, printed in the *Social Science Review* for July, 1864. From that article packed with valuable information, here is one paragraph:—"Iodine may be used successfully for another purpose—viz., in cases where the breath is very foetid. The metalloid may be placed in a common smelling-bottle, and may be occasionally inhaled to such an extent as not to produce soreness or dryness of the nostrils or throat. We have known it thus applied with great and immediate advantage, and have found it destroy almost at once the disagreeable odours arising from the eating of onions and from smoking tobacco. We have also recently used it, on the suggestion of Dr. Wynn Williams, as an application to foetid and indolent ulcers and sores on the human body. In hospitals, at the instance of Mr. Hoffman, of Margate, it is now employed in the beds of the sick in some cases, as where there are extensive bed-sores. In these cases the chip-box is employed, the box containing the iodine, and covered with muslin, being placed under the bed-clothes. To this process there is one objection: the sheeting becomes tinged of a brownish colour. The discoloration is easily removed, however, by washing the sheets with a little soda—in a word, iodine may be considered as the readiest and best of all disinfectants."

Various valuable papers on the therapeutic properties of iodine are scattered over the medical journals. In the *Lancet* for Aug. 6, 1864, there is mention of a case of erosive ulceration of the derma of the nose, cured Mr. Ure with the external application of iodine.

In your own journal has appeared a paper on the danger of iodine poisoning, of which the *Medical Circular* for Nov. 9, 1864, gave the following summary:—

"The subject was an Indian lad, aged 17, who had become a patient from mumps, the sequel to a bilious remittent or Bombay fever. When the acute stage of inflammation of the parotids had passed away, the remaining enlargement was painted

with a very strong solution of iodine, the tincture having been rendered much stronger by evaporation. Five hours after the using of the paint, vomiting and purging supervened, and on the day following there were present all the symptoms of iodism in their severest form. Death occurred in about thirty hours after the application of the iodine. A post-mortem was made, and the examination showed that the mucous membrane of the stomach was studded with small ecchymoses; that the small intestines presented similar ecchymoses. The left kidney was atrophied, weighing only an ounce. Bladder healthy, containing $\frac{3}{4}$ jss. of urine, in which were slight traces of iodine."

In my own practice, the internal use of small doses of iodine, with iodide of potassium, in bitter effusion, is a reliable remedy in cases of syphilis; and, as a gargle for sorethroat in the same cases, tincture of iodine and solution of chlorinated soda in water are of marked benefit.

The compound iodine ointment, rubbed into the shin-bones of syphilitics, banishes the usual nocturnal pain felt in the legs. The same ointment, four days after a fly blister, is very useful when applied in cases of chronic pleurisy.

In the dysmenorrhœa of corpulent women iodine inwardly is also useful. Taking a hint from the *Med. Times and Gazette* for July 10, 1869, I have used it successfully for periodontitis, as recommended by Professor Abbott, of New York, in the following way:—*Rx.* Tinct. iodine and tinct. rad. aconite, equal quantities. Apply to gums with a brush once or twice a day, three drops at a time. Allow to dry on gums.

In combination with any anodyne liniment, iodine is a beneficial outward application in cases of chronic strumous peritonitis; and presently under my charge there is an obscure painful swelled knee case, in a young woman, that has been benefited by the external application of liniments of iodine, chloroform, and belladonna, in combination. While I have cured two cases of scrotal hydrocele, one in a mason and the other in a baker, with iodine—the operation being performed in late Mr. Syme's simple manner—equal success has not followed its injection into the sinuous ulcers of strumous subjects; and in the treatment of ringworm, iodine has proved inferior to either strong acetic acid, sulphurous acid, or lotion of corrosive sublimate.—*Medical Times and Gazette*, Oct. 1, 1870, p. 391.

121.—A NEW IODINE PAINT.

By Dr. J. WARING-CURRAN, Sutton, Notts.

I have been requested by some professional *confrères* to bring under the notice of the profession, a new *iodine paint*, which I

have had prepared and used with satisfaction and success, in the cases of glandular enlargements and scrofulous diseases, wherein iodine is called into requisition. In the hands of esteemed and eminent practical surgeons, it has proved equally beneficial as in my own practice, and they speak or write in flattering terms of it to me.

I rub down half-an-ounce of iodine and a like quantity of iodide of ammonium in a Wedgwood mortar, and gradually dissolve it in twenty ounces of rectified spirit; to this I add four ounces of glycerine, shaking the solution well together. A very nice paint is thus obtained, which has the following advantages:—

1. The iodine is prevented escaping owing to the combination, which, in the form of ordinary tincture, in warm weather it is very apt to do.

2. It preserves the iodide of ammonium instead of the iodide of potassium; the former being a more powerful absorbent than the latter, which recent investigation has verified.

3. The action of the glycerine is soothing to the skin, keeping it soft and pliable, a contrast to the shrivelling of cuticle produced by the ordinary tincture in common use, which frequently acts as a vesicant. But where absorption is desired, the part affected and its neighbourhood influenced, as well as the system generally, by iodine, and no local irritation required, this combination in form of paint will be found superior to the old tincture.

Some time ago, in the columns of the *Medical Press*, I gave a history of very extensive bronchoceles met with in the Valley of Rossendale, which were reduced by the iodide of ammonium, exhibited internally, as well as locally applied in form of citrate. Since then I have seen parallel cases in Derbyshire, which were much benefited also by the combination of iodine, iodide of ammonium, and glycerine, to which I now direct attention.

I have not confined the use of the preparation alone to glandular swellings or scrofulous gatherings. I have employed it in chronic cutaneous diseases, to nodes, over enlarged livers, diseased joints, to hypertrophied parts or morbid growths, and in cases wherein it was necessary to alter an abnormal action or promote absorption, and the result was uniformly satisfactory, and I think I may safely say, the effect of the iodine was more readily appreciable, and more quickly demonstrated in its action on the system generally, as well as by its absorbent properties locally, than the old tincture of the *British Pharmacopœia*, minus its disadvantages.—*Medical Press and Circular*, Aug. 3, 1870, p. 93.

122.—ON ATROPIA AND ITS PHYSIOLOGICAL ANTAGONISTS.

By Dr. ROBERTS BARTHOLOW, A.M., Professor of
Materia Medica and Therapeutics in the Medical
College of Ohio, Cincinnati, U.S.

[The following paper was elicited by one upon the same subject by Dr. Fraser, and consists of extracts from an Essay by Dr. Bartholow, to which was awarded one of the National Medical Association's Annual Prizes for 1869.]

Atropia and Physostigmia.*—The opposite effects of atropia and physostigmia on the pupil are so striking, that a physiological antagonism, extending throughout the whole range of their action, would seem to be probable. The dilatation of the pupil as produced by atropia is due, as shown in the preceding pages, to contraction of the radiating fibres of the iris. As the circular fibres of the iris are innervated by the third pair, the contraction of the pupil produced by physostigmia must be due either to paralysis of the sympathetic or to excitation of the sphincter muscle. These two agents must, therefore, act oppositely upon the sympathetic system, or one must act upon the sympathetic and the other upon the nervous system of animal life.

Dr. Fraser, of Edinburgh, has published an admirable paper upon the physiological effects of the extract of Calabar bean. I shall avail myself of his very exhaustive labours, assuming that what he has informed us of the action of Calabar bean is entirely correct. I take this position the more readily, because my own observations with this agent are entirely in accord with Dr. Fraser's. In order to a more ready comprehension of the reactions which ensue when these two agents are conjointly administered, I place in parallel columns the principal physiological effects of each:—

ATROPIA.

A spinal paralyser.
Destroys excitability of motor nerves.
Destroys the muscular irritability.
Destroys the excitability of the sensory nerves.

Increases the action of the heart and the arterial tension, by an excitation of the sympathetic. Increases action of heart after division of pneumogastric.

Increases respiratory movements.
Dilates the pupil.

PHYSOSTIGMIA.

A spinal paralyser.
Destroys excitability of motor nerves.
Preserves the muscular irritability.
Increases rather than diminishes the excitability of the sensory nerves.

A large dose produces cardiac syncope; action of heart ceases in diastole. This effect is not produced through the pneumogastric, although this nerve is ultimately paralysed, for it follows when the pneumogastric is divided, nor does it result from paralysis of respiration. The cardiac syncope is due to a direct action on the cardiac ganglia.

Diminishes arterial tension.
Paralyses muscles of respiration.
Contracts the pupil.

* The Physostigmia (calabarine) employed in these researches was made by Merck, of Darmstadt, who enjoys a deservedly high reputation on the continent of Europe for his pharmaceutical preparations.

We have now the data for estimating the influence which these agents exert upon each other, when administered together.

Experiment.—Injected under skin of a frog 20 minims of a solution containing $\frac{1}{48}$ of a grain of physostigma and $\frac{1}{24}$ of a grain of atropia. In fifteen minutes there was complete paralysis of the hind extremities and partial paralysis of arms. Sensation was not abolished, for when the skin was pricked, or muscles pinched, the frog attempted to escape. Soon after, however, on pinching an extremity the limbs were agitated by violent tetanic spasms, especially the upper. A slight tap on the back produced these effects: closure of eyelids, a sharp cry, opisthotonos, and tetanic rigidity of the limbs. Meanwhile the frog lay completely relaxed without the least motion. When taken by the head and raised up, the limbs hung down perfectly flaccid. A quick sudden blow, however, induced the tremors and the tetanic shocks. He lay in this condition a half hour apparently dead, when I inserted under the skin of the thigh $\frac{1}{4}$ of a grain of the sulphate of atropia. Returning to the room after an absence of two hours, I found that all the toxic symptoms had disappeared; the frog jumped and was as active and lively in every respect as before the experiment commenced.

Experiment.—Injected as before under the skin of a frog $\frac{1}{16}$ of a grain of physostigma. Paralysing effects were manifest in three hours. Then injected $\frac{1}{12}$ of a grain of atropia (sulphate). Soon after the atropia was administered, the frog, when struck a quick, slight blow, uttered a cry, and was agitated by sudden tonic contractions of all the muscles. Slow and gradual pressure with the fingers did not produce these tetanic convulsions, but a quick tap on any part of the body gave rise to them. Then injected an additional $\frac{1}{12}$ of a grain of sulphate of atropia. A succession of tremors soon after agitated all of the muscles, especially those of the thigh, the limbs and body being all the time perfectly limp and flaccid. When the tremors ceased, no tetanic spasms could be induced by a blow upon any part of the body. The frog then became entirely insensible to irritants, and appeared to be without life. On opening the chest, however, the heart was found to be pulsating strongly and equably 52 per minute.

Experiment.—To a cat administered $\frac{1}{8}$ of a grain of sulphate of atropia by subcutaneous injection. The usual toxic effects manifested themselves in a few minutes: dryness of mouth; redness and injection of the fauces; dilatation of pupils; partial paralysis of hind extremities; sensibility to touch, to pain, and especially to temperature diminished; reflex movements normal. Injected then $\frac{1}{8}$ of a grain of calabarine. In five minutes decided contraction of the pupil occurred; paralysis of all the muscles of animal life took place, so that the cat hung perfectly

limp and flaccid when suspended by the ears ; occasional tremors, especially of the limbs, and slight tetanic spasms on irritation of surface occurred, notwithstanding the complete paralysis ; respirations grew slower and slower, and after the lapse of three hours occurred only at the rate of one in five minutes ; action of heart continued, but gradually lost power and diminished in frequency of pulsations ; complete anæsthesia of cornea ; reflex and accommodative movements of the eye finally abolished. Respiration ceased before action of heart.

In subsequent experiments I varied the proportion of atropia and calabarine (physostigmia) in order to ascertain how far these agents were antagonistic as to toxic power. Thus to a large and powerful cat I administered by hypodermic injection $\frac{1}{2}$ of a grain of sulphate of atropia, and $\frac{1}{24}$ of a grain of physostigmia. The symptoms of atropia poisoning were first manifested and afterward the effects characteristic of physostigmia, without, however producing a fatal result. In corresponding doses physostigmia is more powerful than atropia ; hence in order to obtain a balance of physiological effects, sufficient atropia must be administered to produce some dilatation of the pupil, and as physostigmia is slower and longer in action, the effect of the atropia must be maintained by continued use. If a quantity of physostigmia, just sufficient to produce a fatal result, be administered, its toxic power may be counterbalanced by atropia given so as to maintain a slight degree of dilatation of the pupil. Large quantities of both these agents, administered simultaneously, so overpower the nervous centres (the cerebrum and respiratory centre) as to destroy life.

The results then of the study of the mutual reactions which obtain between atropia and physostigmia when administered together, may be stated as follow :—

Atropia and physostigmia are not antagonistic as regards their action upon the muscular system of animal life—paralysis being induced by both. Atropia produces paralysis by destroying the muscular irritability and the excitability of the motor nerves ; physostigmia by paralysing the spinal cord.

Atropia and physostigmia are antagonistic as regards their action on the sensory nerves ; atropia destroying and physostigmia heightening the sensibility of these nerves.

They are antagonistic as to their influence over the respiratory movements ; atropia increasing and physostigmia retarding them.

They are antagonistic in their action upon the heart ; atropia producing excitation of the cardiac ganglia, and physostigmia paralysing these ganglia.

They are opposed in respect to their action on the sympathetic; atropia producing increased action of the sympathetic; physostigmia paralysing this system.

They have opposite effects on the pupil in virtue of opposite effects on the sympathetic; atropia dilating the pupil by its action on the radiating fibres of the iris; physostigmia contracting the pupil by paralysing the radiating fibres.

A very singular effect, which I was not prepared to find, is the peculiar exaltation of the reflex faculty produced in frogs, when these agents are administered together—a sudden irritation of the surface causing tetanic rigidity like electric shocks, the muscles immediately afterward resuming their very relaxed and flaccid condition. Atropia sensibly weakens, although it does not abolish entirely, the reflex faculty; physostigmia destroys the reflex faculty; yet the combination of the two agents produces effects not unlike those of strychnia. The analogy is preserved even after death, for post-mortem rigidity sets in at once and is very decided. The tetanic spasms must not be confounded with the tremors which are characteristic of physostigmia. These tetanic spasms are less marked in warm-blooded animals, but they nevertheless occur to a limited extent, and after death a marked degree of rigidity exists, the head and neck being curved back and the feet turned in.

Dr. Fraser also alludes to the reputed antagonism between atropia and prussic acid. As I have, in the essay referred to, examined this question, it may be worth while to submit my remarks upon this topic.

Atropia and Prussic Acid.—It has recently been asserted by M. Preyer that atropia is the physiological antidote to prussic acid. He was conducted to this conclusion by reflecting upon the mode in which prussic acid produces death. As prussic acid in large doses causes paralysis of the heart, he assumed that an agent which would paralyse the pneumogastric, the inhibitor nerve of the heart, and at the same time stimulate the central nervous apparatus of respiration, would prove to be the true physiological antidote. He, however, prudently restricts the use of atropia to those rare cases of poisoning by prussic acid, in which “there is apnoea and the heart remains beating.”

There are various theoretical considerations opposed to this view. Piotronosky affirms that he has produced tetanic spasms of the heart and wrinkling in the transverse folds of its external fibres, by direct irritation of the vagus. This experiment is submitted in proof of the statement that the external fibres of the heart are innervated by the vagus and the internal by the sympathetic. If this be the case, it is obvious that an agent which simply paralyses the terminal filaments of the pneumogastric, would not supply the effect required. Moreover, divi-

sion of the pneumogastric produces decided slowness of respiration, after having for a short period quickened it somewhat. Further atropia has but little influence over the respiratory movements. Its real power consists in excitation of the cardiac ganglia of the sympathetic, and whatever of physiological antagonism there is between atropia and prussic acid must be referred to the difference in their action upon the heart.

Theoretical considerations must yield to the demonstrations of experiment. M. Preyer has demonstrated on rabbits and guinea-pigs, that the subcutaneous injection of small quantities of atropia is an unfailing antidote to prussic acid if employed quickly after the injection of the acid. I have submitted this statement to the test of experiment.

Experiment.—I passed into the throat of a pigeon, by means of a pipette, 5 minims of medicinal prussic acid (U.S.P.), and immediately injected $\frac{1}{4}$ of a grain of sulphate of atropia. The bird had in a few minutes convulsive movements of the head, neck, and eyelids; fell down, and expired in a general convulsion of a tonic character.

The fatal result in the preceding experiment may be attributed to the atropia. In order to obviate this objection, I changed the order of administration of these agents. As pigeons are not very susceptible to the action of atropia, I also increased the quantity administered by subcutaneous injection.

Experiment.—Administered to a pigeon by subcutaneous injection one-eighth of a grain of atropia. When the influence of this began to be manifest, passed into the gullet by a pipette 5 minims of the medicinal hydrocyanic acid. Death ensued precisely as in the first case.

It may be urged against these experiments that pigeons are not suitable subjects. As cats are readily affected by both these agents, in my subsequent experiments I employed these animals. The details of the experiments and the results being so uniform, I need narrate but one as a type of all.

Experiment.—Administered by subcutaneous injection to a cat one-fourth of a grain of atropia. When the symptoms characteristic of atropia poisoning were produced, I poured into the gullet 10 minims of a medicinal hydrocyanic acid. The cat fell upon her side, had a few convulsive twitches of the extremities, uttered a sharp cry and expired.

In these experiments on cats I preferred to bring them under the influence of atropia before administering the prussic acid, because of the great difference in the rapidity with which these agents act. If there really existed a true physiological antagonism between them, there could be no difference in result whether atropia or prussic acid were first administered. It is clear, I think, that no such antagonism exists as supposed by

M. Preyer, but it may be admitted that atropia will be useful in counteracting the depression of the heart's action in those rather exceptional cases in which the symptoms of poisoning are delayed, or in those cases in which just sufficient prussic acid has been administered to produce dangerous symptoms, there being time enough to employ cardiac stimulants.—*Practitioner*, July 1870, p. 27.

123.—SUCCEDANEUM OF QUININE.

M. PAVIA, an Italian professor of chemistry, has isolated, from the leaves and roots of boxwood, an alkaloid which he calls bussine. This substance has been tried in the treatment of marsh fever by several physicians in Italy, and with success at the rate of 75 per cent., quinine generally yielding 80 per cent. of cures. It should be mentioned that, in several cases, gastric uneasiness, pyrosis, thirst, sickness, giddiness, and tinnitus aurium were complained of.—*Lancet*, May 28, 1870, p. 769.

124.—CHLORATE OF POTASS IN CHRONIC ULCER.

By ERASMUS WILSON, Esq., F.R.S., Professor of Dermatology in the Royal College of Surgeons, England.

[In the year 1866, a man, aged forty-nine, consulted Mr. Wilson on account of some ulcers on the leg, which had been in existence two years. They were six or eight in number, and the intervening skin was red and irritable from the presence of ekzema squamosum. Mr. Wilson came to the conclusion that the hidden cause of the disease was syphilis, although this conclusion was arrived at more by negative than positive evidence. Five grain doses of iodide of potassium, with a drachm of fluid extract of sarsaparilla, twice in the day, were prescribed, and this treatment afforded great relief, without absolute cure, the disease returning again and again.]

In 1868, he returned to me early in the year with the sores still unhealed; he thought the ointment irritated the skin, and I substituted camphor for carbolic acid in the zinc ointment, and prescribed for him five grains of citrate of iron and quinine, twice daily. But in April, I again felt the necessity of resorting to the iodide of potassium. In September he pointed out to me four tubercles, apparently syphilomata, situated around the ankle; and as I was growing discontented with the powerlessness of the iodide, I gave him the perchloride of mercury

with bark. But the perchloride seemed to have as little permanent influence as the previous remedy; and in November I again fell back upon a graduated course of the iodide of potassium.

It was observable that the longest intervals of benefit always followed the graduated course of iodide of potassium; that for a while it could be depended upon, but that sooner or later all the old symptoms returned. Thus at his last visit in November I put him under a course of iodide of potassium, and he found no necessity for returning to me until August, 1869. He then informed me that the ulcers had healed over under the iodine course, and had remained healed for several months; but that they had now broken out afresh. And in this instance, as he had been taking the iodide so recently, I had recourse to the solution of the perchloride of mercury with cinchona.

I had now to consider my patient's case as one of some difficulty and no ordinary obstinacy; and, therefore, when he presented himself to me some two months later, in no degree improved, but rather worse than usual, I determined to vary my method of treatment and try the effect of the chlorate of potass, instead of the iodide of potassium. I had previously found the chlorate of potass valuable in other obstinate cases originating in syphilitic cachexia, and I had employed it also in cancerous cachexia with benefit; and the case before us seemed well adapted to test its capabilities. In the early part of November, 1869, therefore, I prescribed ten grains of the chlorate of potass twice daily; with the application to the ulcers, once in the day, of a solution of chlorate of potass in glycerine, of the strength of one drachm to the ounce. Four months later, namely, on the last day of February, 1870, he again paid me a visit; this time, evidently, very much improved in health, and in good spirits: the leg, he said, was sound, and he felt better than he had ever done before. He stated that the local action of the chlorate of potass was very remarkable; he could see a change for the better every time he used it; that the foul appearance of the sore rapidly vanished, and that it filled up with firm granulations. At one time, he said, he had nine ulcers upon the leg, the largest about an inch in diameter, and all circular in figure, but they were now completely healed, and more solidly than had been the case before. After five years of experience in this troublesome malady the opinion of the patient was not without its value; and he stated that the last treatment had produced a more decidedly favourable effect both on the sores and on his health in general, than any other he had undergone.—*Journal of Cutaneous Medicine*, June, 1870, p. 9.

125.—ON THE THERAPEUTICAL EMPLOYMENT OF LACTATE OF IRON.

By JAMES C. DICKINSON, Esq., late Bengal Medical Service.

[Lactate of iron has, for the last five years, been extensively prescribed as a tonic both by civil and military surgeons in the Bengal Presidency.]

Lactate of iron was first largely prescribed by me in those extreme cases of debility and anæmia, the sequelæ of the most severe form of malarious fever I ever witnessed in India—the Bhootan fever,—presenting, in my opinion, all the depressant characteristics in an intense degree of the Assam fever—a fever which had hitherto been looked upon by Indian practitioners as the most deadly form of fever—the Peshawur even not expected. The condition of the invalids sent down from Bhootan was as follows:—Extreme prostration, with great tendency to relapse after the slightest exertion or exposure to the sun; enlargement of the spleen in many cases; anæmia; loss of appetite; great depression and giddiness. The emaciation and peculiar sand-like colour of the skin were so remarkable, that among a crowd of invalids you could at once, without hesitation, pick out with perfect certainty the “Bhootan-wallahs” as they were named by the other soldiers. In these cases I prescribed a teaspoonful of the syrup (the form in which I always prescribe it), in water, three times a day. After the medicine had been taken for about ten days, I generally noticed a very marked improvement in the general appearance; depression and sense of being easily fatigued had disappeared, the appetite in the majority of cases was completely restored; and so steadily and rapidly did many of them improve that in about twenty days from their first taking the lactate a patient was enabled to proceed on board ship, without assistance, and look forward to the voyage home with comparative pleasure. Another class of cases which have benefited by the lactate of iron are female complaints, especially anæmia, chloro-anæmia, leucorrhœa, and passive hemorrhages generally. The two former classes of cases have led me to regard the lactate of iron as a very valuable remedy in female complaints, especially in those forms which depend upon debility.

In anæmia, the first favourable symptom I noticed in patients after taking the lactate was a marked increase in the appetite; this was soon followed by their feeling stronger; they could walk up and down stairs more easily, the palpitation and puffing, the giddiness and headache, insensibly diminished, the healthy complexion was soon recovered, and all functional disturbance was removed.

In leucorrhœa, I mean that form so commonly noticed among European females in India soon after parturition, I seldom had much difficulty in curing them of this distressing local discharge; as when the beneficial effects of the lactate of iron became evident, a simple astringent injection completed the cure. In functional palpitation of the heart dependent upon debility, and in certain forms of dyspepsia, I have prescribed this medicine with advantage.

In hypertrophy of the spleen—a disease of very common occurrence in all parts of India—I have latterly always prescribed the lactate in preference to any other preparation of iron as soon as the enlargement of the gland was reduced to its normal size by the exhibition of bindaal (*Luffa echenata*, Nat. ord. Cucurbitacæ).

The syrup is well adapted for administration to young children, as the taste is not unpleasant. In general atrophy—not uncommon in European children born in India, due to the carelessness of native servants in allowing children to eat whatever and whenever they like, and not unfrequently to the practice of engaging native wet-nurses, who suckle their own children as well as the European,—I have prescribed this medicine, in combination with cod-liver oil, with the best results.

For boils, which are so common in India, and which present so many varieties, and frequently prevail epidemically, I have found this preparation of decided benefit; it fortifies the system against the debility that boils induce, and thereby, in my opinion, arrests the tendency they so frequently have to recur—*e.g.*, the Delhi boil. In females in India, and I may add in England, who are subject to successive crops or periodical attacks of boils, where the cause is traceable to some kind or other of menstrual irregularity or mal-assimilation of food, I know of no medicine better calculated to satisfy the hopes of the medical practitioner than lactate of iron.

As a prophylactic against malarious fevers, I have found lactate of iron of great service, due no doubt to its hæmatinic properties; while in some cases, where from idiosyncrasy quinine cannot be borne by the stomach, I have found the lactate a useful substitute. The lactate cannot, however, occupy the position as a prophylactic for Indian fevers that quinine does; it must only be regarded as ancillary to it.

The above *résumé* of cases in which I have employed the lactate of iron leads me to think that this medicine deserves a trial. It possesses all the properties of the other preparations of iron; as a blood-restorer it is a very effectual remedy; it does not produce constipation, is almost devoid of any dis-

agreeable taste, and in most cases rapidly restores the appetite. As it possesses scarcely any astringency, it may be given when the stomach will not bear the more styptic preparations of iron.

Messrs. T. Bell and Co., of Oxford-street, have on several occasions prepared for me the syrup, and it possesses all the properties I have ascribed to the lactate in this paper.

The dose for an adult is a teaspoonful, gradually increased to two, taken either in water or soda-water; and for children half a teaspoonful twice a day, and gradually increased according to age.—*Lancet*, Aug. 20, 1870, p. 248.

126.—ON THE CHEMICAL NATURE OF WHEY AND MILK.

By HERMANN LEBERT, Professor of Clinical Medicine in the University of Breslau.

If we compare different kinds of milk with reference to their solid constituents we find that asses' milk is most dilute, containing scarcely 9 per cent. solid matter; next stands human milk with somewhat over 11 per cent.; next stands goats' milk with $13\frac{1}{2}$ per cent.; next cows' milk with over 14 per cent.; then sheep's milk containing 16 per cent. (according to an analysis recently made in my laboratory even 18 per cent.); and, lastly, mares' milk containing 17 per cent. From these facts asses' milk would be applicable in cases where a dilute milk seems desirable. Goats' and cows' milk represent the average quality; sheep's milk would be suitable when that containing a large amount of nourishment is thought necessary, and it is preferable to the rich mares' milk—which in the central parts of Europe is also frequently applied to therapeutic purposes—because it contains a larger quantity of albumen and casein.

Still more important than the total amount of the solid matter is the amount of casein and albumen. Excepting mares' milk, which is excessively poor in this respect, human milk is the poorest, containing only 4 per cent. of casein, whilst cows' milk contains nearly 5 per cent., and more than $\frac{1}{2}$ per cent. albumen. In direct opposition to the latter stands asses' milk, with only 2 per cent. casein and albumen, and for this reason it is beneficially employed in inflammatory chronic diseases, in which the supply of nitrogenous matter must be confined within moderate limits. Goats' milk, with $5\frac{2}{3}$ per cent. of casein and albumen, is particularly characterised by its large amount of albumen, which is $1\frac{1}{3}$ per cent., and sheep's milk is

in this particular again the richest, since of $5\frac{1}{3}$ per cent. of casein and albumen, as much as $1\frac{2}{3}$ are albumen.

Asses' milk contains also the smallest quantity of butter, whilst cows' and human milk contain $4\frac{1}{3}$ per cent., sheep's milk nearly 6 per cent., and goats' milk nearly 7 per cent. Goats' and sheep's milk contain, again, the largest amount of hydrocarbons, and the sheep exhibits the enormous value of the nourishing constituents of its milk by its containing $11\frac{1}{4}$ per cent. of proteine matters and hydrocarbons.

The milk sugar amounts on the average to 4 per cent. in the cow, goat, and sheep, and to more than five per cent. in the ass.

The salts, chlorides of the alkalies, earths, &c., amount to $\frac{1}{2}$ or $\frac{2}{3}$ per cent. on the average in different kinds of milk. The large amount of milk-sugar in mares' milk—viz., 8 per cent.—only moderately increases its nutritive value, but renders it prone to alcoholic fermentation, whence arises its manifold application in courses of "Koumyss" treatment amongst Tartaric tribes.—*Medical Times and Gazette*, Aug. 13, 1870, p. 173.

127.—NEW PRESERVING FLUID FOR PREPARATIONS.

M. MEHU, Pharmacien of the Necker Hospital, states that for the last two years he has been experimenting with various antiputrescible fluids for the preservation of anatomical specimens, and has at length discovered one which answers excellently. This liquid only contains a small proportion of alcohol, and hence does not cause any considerable contraction of soft textures, which with him have chiefly been portions of the mucous membrane of the bladder, prostate, &c. It contains arsenious acid, which preserves them from decomposition, and the development of cryptogamic vegetation is prevented by the addition of a small quantity of crystallised carbolic acid. The formula is—Arsenious acid, 20 parts; crystallised carbolic acid, 10 parts; alcohol, 300 parts; distilled water, 700 parts. The preparation of this fluid has led him to notice the great solubility of arsenious acid in alcohol, which has not hitherto attracted attention.—*Lancet*, June 18, 1870, p. 884.

128.—SYPHILIS.

We have found very few cases of secondary syphilis that have not yielded in a very satisfactory way to a combination of $\frac{1}{8}$ th of a grain of perchloride of mercury, 5 to 15 grains of iodide

of potassium, and a scruple of chlorate of potash, taken three times a day in some bitter infusion, such as gentian or quassia. The addition of the chlorate of potash appears to us to do more than merely prevent salivation. From a number of experiments with it, we are convinced that it increases the efficacy of the mercury, so that a small dose produces a more decided effect when taken along with it.—*Journal of Cutaneous Medicine, June, 1870, p. 61.*

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